FLIGHT

MAGAZINE

B 924766

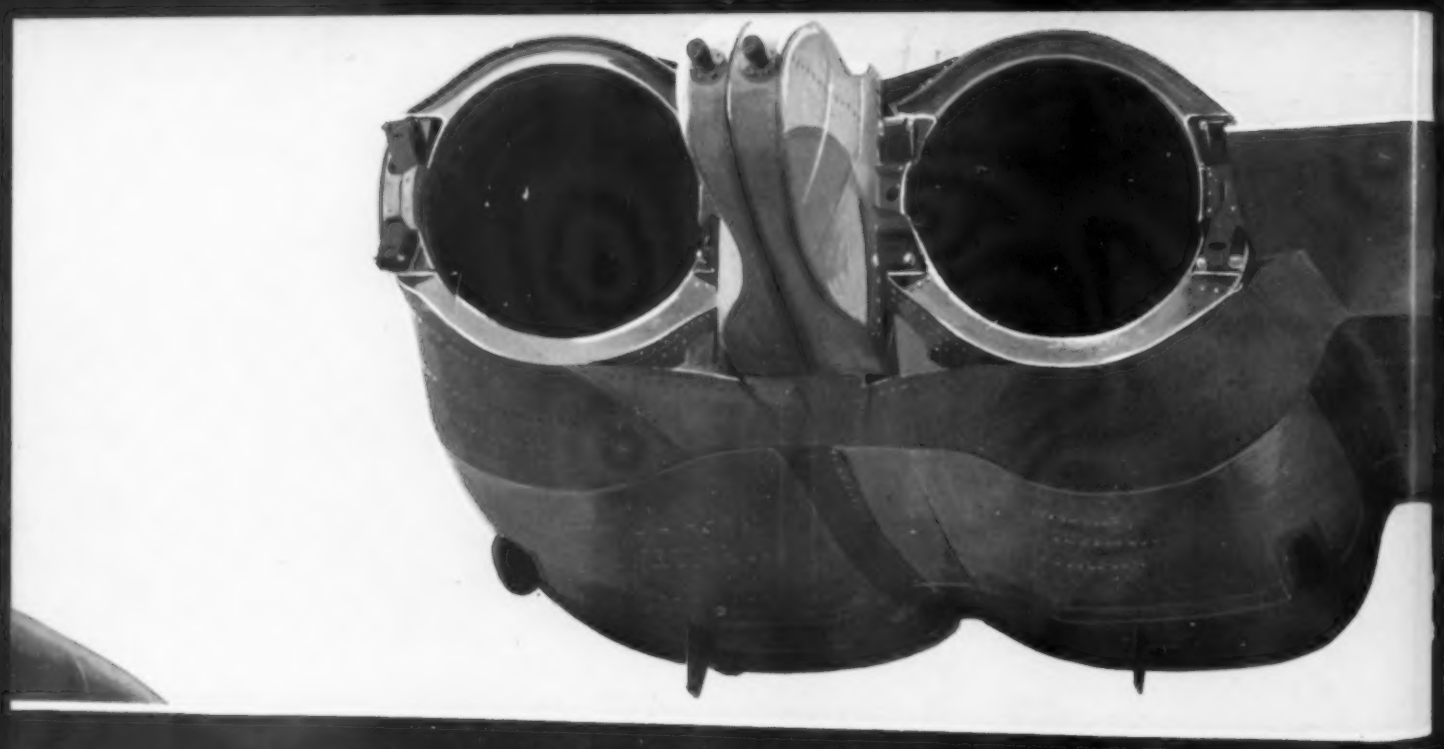
SEPTEMBER 1961

50 cents

SEP 19 1961

THE LIBRARY OF
CONGRESS
SERIAL RECORD
SEP 29 1961

GRUMMAN GULFSTREAM



Quick step from prop to JetStar

If you're now a corporate pilot, you can check out in a JetStar with no trouble. Not that the JetStar is just another multi-engine plane. Because it isn't. It's a high-speed, high-altitude, compact jet transport. You'll have to learn about jet powerplants and high-altitude navigation techniques. One reason you'll learn quickly is because the JetStar also has slow-speed performance on take-off and landing that's not much different from what you're used to. In fact, we think you'll agree that it's the safest, easiest-to-handle multi-engine airplane you've ever flown. For data on complete ground school and flight training that goes with every JetStar – write on company letterhead to Don Mills, Chief Pilot, Lockheed-Georgia Company, a division of Lockheed Aircraft Corp., Marietta, Ga.

JETSTAR

FLAGSHIP FOR YOUR CORPORATE FLEET

Fly an H-H & I-A Interior!

HORTON — HORTON

&

INTER-AMERICA

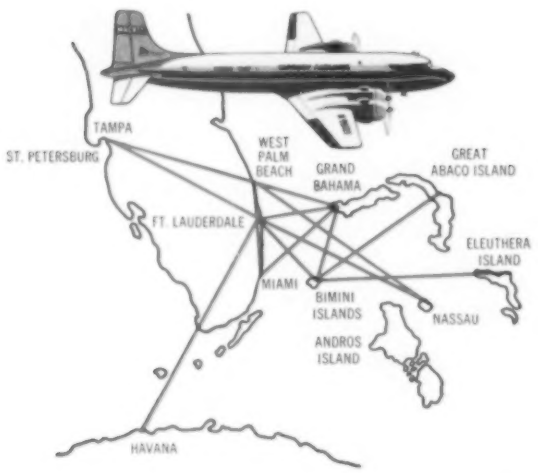
MArket 4-2181 or 4-8416 • Fort Worth

AIRFRAME • MODIFICATION • ENGINES • ELECTRONICS • RADIO • RADAR • INSTRUMENTS • ENGINEERING • DESIGN • FABRICATION • INTERIORS
PAINTING • PROPELLERS • EXPERIMENTAL • CONSULTING • ACCESSORIES • INSPECTION • SERVICE • TANK SEALING • MANUFACTURING

Former barnstormers dedicated to modern aviation—Col. Joseph C. Mackey, President, and (right) Leonard J. Povey, V.P. and Mgr., Aviation Services.

MACKEY...South Florida Haven for Executive Aircraft

Mackey's new general aviation service ramp, north end of Broward County International Airport, Ft. Lauderdale. Other facilities (office, lounges, weather and briefing room, etc.) are behind service hangar.



The sunshine routes of Mackey Airlines. A perfect safety record, courteous service, comfortable seats, and reasonable fares. For full enjoyment of tropical and island scenery, all flights are scheduled during daylight hours.

● For "turn-around," "port-of-embarkation," or transient service in South Florida...try Mackey at Ft. Lauderdale. You'll have the unique experience of being looked after by the skilled personnel of a scheduled international air carrier . . . as well as enjoying some of the finest fixed-base facilities in the country. Especially tailored for executive and business flying, the new Mackey facilities feature an owners lounge, executive conference room, pilots lounge, briefing room equipped with weather teletype and direct line to FAA flight service, airport shuttle service, palm-shaded swimming pool, and a coffee pot that's always on. And if you're bound for foreign places, you'll find Mackey a big help with the nearby customs, overseas clearances, routes, etc.

On the ramp, too, everything is first class—24-hour service, modern refueling trucks, ADI cart—and dependable Phillips *66* Aviation Gasoline (80, 100, and 115 octane) and Turbine Fuel. Routine maintenance by A&P's or IA's is available right at the ramp . . . major jobs at the airline maintenance hangar nearby. Mackey also provides multi-engine charter by ATR pilots . . . and, of course, scheduled airline flights in Florida and to the Bahamas.

The lady passengers especially will enjoy the air-conditioned and comfortably appointed owners lounge . . . secluded from the noise and activity of the service ramp.

A cool and relaxing dip while your aircraft is being serviced. In a setting of tropical greenery, this pool is for the exclusive use of Mackey customers and their guests.

Mackey's executive conference room is available to all its customers—an exclusive facility that executive and business fliers should find especially convenient.

AVIATION DIVISION ● PHILLIPS PETROLEUM COMPANY
BARTLESVILLE, OKLAHOMA

PHILLIPS 66

AIR Report

Significant Trends and News

RECORD SALES OF 4-PL. MOONEY MARK 21 are establishing the all-metal, 180-hp., 180-mph. Mooney as the biggest-selling single-engine airplane with retractable landing gear. Mooney Aircraft reported 30 deliveries of Mark 21's in July, up from 28 in June. Nearest competitors were the Comanche 250 with 21 deliveries and the Beech Bonanza with 20 deliveries.

NEW PRESIDENT OF AIRCRAFT RADIO CORP., a subsidiary of Cessna, is Neil P. Whitney, former general manager of Cessna's Industrial Products Division at Hutchinson, Kas. Whitney succeeds William F. Sauers, who resigned as president of ARC.

NEW FAIRCHILD F-27F, issued a new FAA type certificate, has range for transcontinental nonstop flight, maximum take-off gross weight increase to 39,400 lbs., landing gross weight increase to 37,500 lbs. and improved pressurization providing 8,000-ft. cabin altitude at 25,000 ft. R. A. (Dick) Henson, Fairchild's F-27 program director, said the firm is also offering a new "G" model of the F-27 with still greater range and 42,000-lb. take-off weight. Type certification is expected early in 1962.

NORTH AMERICAN T-39 SABRELINER production reached a peak of 3 airplanes a month in August. The output rate will reach 5 planes monthly in October. Twenty of the twin-jet small utility transports had been produced at the end of August. A total of 94 Sabreliners have been ordered by the U. S. Air Force. North American Aviation has been considering commercial marketing of the 500-mph. Sabreliner, but no decision had been reached last month.

MANAGER OF NEW DULLES INTERNATIONAL AIRPORT serving Washington, D. C., will be William E. Cullinan, Jr., FAA district airport engineer in Portland, Maine, when appointed to the new post by FAA Administrator N. E. Halaby. New Washington airport won't become operational until fall of 1962.

HUGHES AIRCRAFT WILL PRODUCE 4-PL. MODEL 369 TURBINE-POWERED HELICOPTER for evaluation in the Army's current LOH (light observation helicopter) program. Others producing LOH machines are Bell and Hiller. A. W.

(Continued on page 12)

WINGTIP FUEL TANKS FOR 1961 PIPER COMANCHE, with 15 gals. each, boost usable capacity to 90 gals. on standard Comanche or to 120 gals. if airplane has Piper's optional wing tanks. FAA-certificated by Brittain Industries, 463 N. Prairie Ave., Hawthorne, California, they also provide for gross weight increase up to 3,000 lbs. for all PA-24-250's. Total weight added by wingtip tank installation is 24 lbs. and Brittain kit sells for $995. Brittain's 20-gal. tip tanks for Bananzas are marketed by Beech Aircraft.

FLIGHT MAGAZINE

SEPTEMBER, 1961 VOL. 50, No. 9

THIS MONTH'S COVER pictures one of Atlantic Aviation's Grumman Gulfstream demonstrators—Atlantic was the first business aircraft distributor to own a million-dollar demonstrator and will show its sixth Gulfstream demo during the NBAA convention in Tulsa this month. How Atlantic sold 30 Gulfstreams in three years is told on page 50.

Air Report—SIGNIFICANT TRENDS AND NEWS 5
Airmen's Calendar—COMING EVENTS 12
Editorials—NBAA AND NPA AT TULSA; UNFAIR COMPETITION?; PRODUCTIVE PUBLIC RELATIONS 21
Cessna Skyknight—First Turbocharged Twin—PERFORMANCE AT ALTITUDE MEANS SAFETY AS WELL AS SPEED 30
Program for 14th Annual NBAA Convention—LIST OF EVENTS FOR BUSINESS FLYING'S OUTSTANDING EVENT OF THE YEAR . . 33
The Jet Commander and Its Legacy—BY TED R. SMITH—PIONEERING AGAIN, ORIGINATORS OF THE LIGHT TWIN READY THEIR FIRST JET 34
New Jet Commander Developments—PRICE, DELIVERY DATES AND PERFORMANCE GUARANTEED IN SALES CONTRACT 37
JetStars Join Business Fleet—EIGHT DELIVERIES GOING TO CUSTOMERS IN SEPTEMBER 38
New Motorola M-4 Automatic Flight Control System—FIRST DETAILS OF NEWEST TRANSISTORIZED AUTOPILOT FOR GENERAL AVIATION 42
New Business Flying Center in Florida—MACKEY AIRLINES' PLUSH FT. LAUDERDALE BASE CATERS TO GENERAL AVIATION PILOTS . . 44
de Havilland Jet Dragon—DESCRIPTIVE DATA ON JET SUCCESSOR TO THE DOVE 48
Boom in Beech Factory Radio Installations—MORE CUSTOMERS SPECIFYING COMPLETE FACTORY INSTALLATIONS 52
3 Years and 30 Gulfstreams Later—ATLANTIC AVIATION'S PHENOMENAL SALES SUCCESS 54
Needed: A Third Level of Air Service—BY E. H. PICKERING—PART II IN A SERIES ANALYZING SERVICE FOR SMALL TOWNS . . 62
New Business in the Hangar—NATIONWIDE ROUNDUP OF INTERESTING DEVELOPMENTS IN BUSINESS FLYING 70

GEORGE E. HADDAWAY, Editor-Publisher; TOM ASHLEY, Managing Editor; E. H. PICKERING, Air Transport Editor; FRED N. STONES, JR., Business Manager; LOUISE ROBERTSON, Circulation; P. O. Box 750 (2700 N. Haskell Ave.), Dallas, Texas — Telephone TAylor 3-6191.

FLIGHT MAGAZINE, September, 1961, Vol. 50, No. 9. Published Monthly. Publication Office, P. O. Box 750 (2700 N. Haskell Ave.), Dallas, Texas. Price 50 cents single copy. Subscription rates: United States, one year, $4.00; two years, $6.00; three years, $7.50. Established February, 1934. Entered as second-class matter at the Post Office, Dallas, under the act of March 3, 1879.

Copyright, 1961, by Air Review Publishing Corporation.

introducing... the triple "S"

The Collins 51Z-3 Marker Beacon Receiver is the first expression of a new concept in airborne electronics—*Solid State Systems.* Designed for airline and general aviation use, the 51Z-3 weighs only 2.9 pounds. It's about the size of a carton of cigarettes and requires no shockmounting. Size and weight are just two of the many advantages of the Solid State 51Z-3. A tough, scratch and chip resistant vinyl finish protects the case. A triple-tuned circuit automatically rejects interference from TV and FM signals which can cause false marker indication. The transistorized 51Z-3 requires only .2 amp for continuous operation and can be installed in any 27.5 or 13.75 volt system. Priced at $608.00*, the TSO'd 51Z-3 Marker Beacon Receiver is available from your Collins Distributor.

**U.S.A. List Price*

COLLINS RADIO COMPANY—CEDAR RAPIDS • DALLAS • BURBANK • NEW YORK

COLLINS

"The S-61L will cut our seat mile costs by half"

"The speed and capacity of these new twin-turbine helicopters will help us reduce our direct seat-mile costs by one-half." That's how C. W. Moore, Executive Vice President of Chicago Helicopter Airways, sums it up as this fast-growing airline readies for its new 25-passenger Sikorsky Copterliners to be delivered this fall. CHA began passenger service only five years ago, and late this year it will carry its one-millionth passenger. Last year it carried 309,000—a 51% jump over the previous year. The Sikorsky S-61L, first helicopter ever designed specifically for scheduled passenger service, provides turbine smoothness . . . airliner comfort . . . twin-engine reliability . . . plus all-weather flight capability. For more cost and operating facts, simply call or write Sikorsky.

SIKORSKY AIRCRAFT Stratford, Connecticut
Division of UNITED AIRCRAFT CORPORATION

BRITISH UNITED

THE SHORT HAUL JET

BAC ONE-ELEVEN

TWO ROLLS-ROYCE SPEY TURBOFAN ENGINES

JET SUCCESSOR TO THE VISCOUNT

WITH EVEN BETTER THAN VISCOUNT ECONOMICS

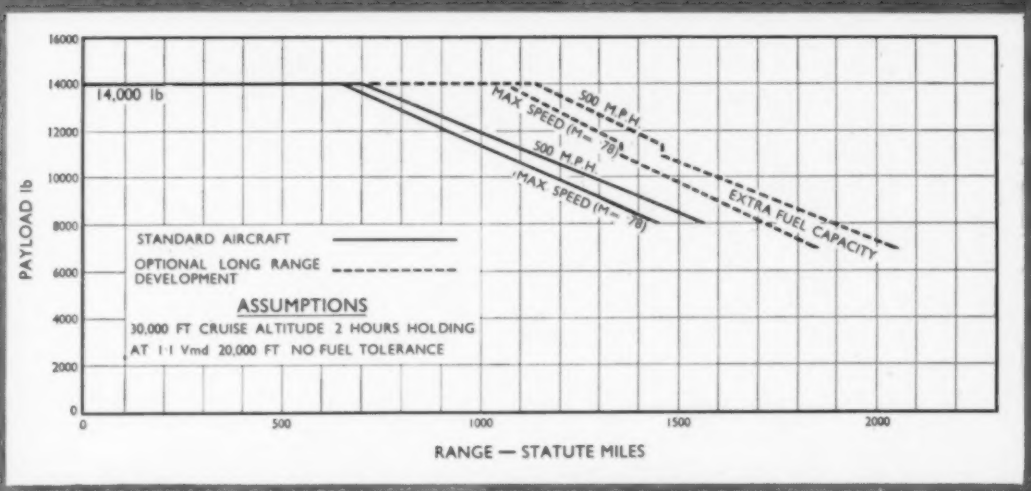
EAIRWAYS CHOOSES

- 540 m.p.h. cruise speed
- 57 mixed class or 69 tourist passengers
- Short airfield performance
- Quick turn-round: built-in auxiliary power unit
- Cabin width for spacious five-abreast seating
- Range of over 1,100 miles with full 14,000 lb payload

BRITISH UNITED AIRWAYS HAS CHOSEN THE OPTIONAL LONG RANGE DEVELOPMENT OF THE STANDARD AIRCRAFT

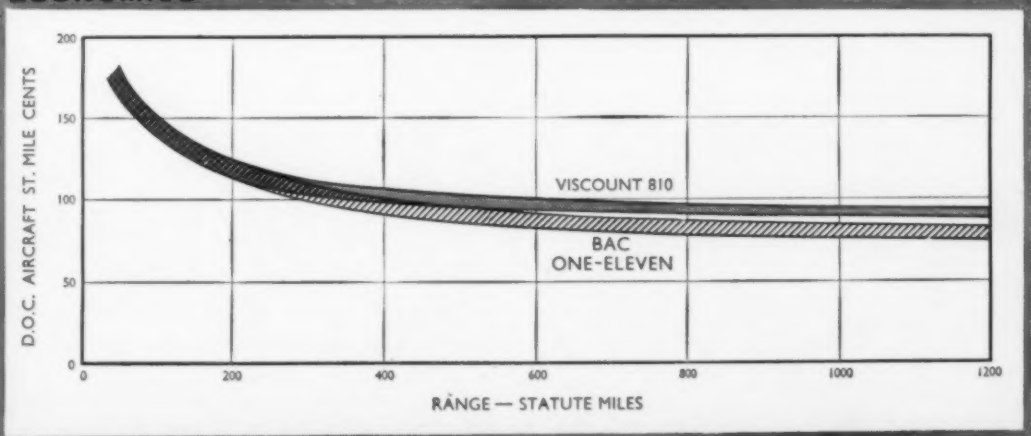
PAYLOAD v. RANGE

The BAC One-Eleven can carry its full complement of 57 mixed class passengers and baggage at 500 mph for stages of 1,070 statute miles with two hours reserves. It can carry 43 passengers for 1,500 miles



ECONOMICS

These bands cover seven separate methods of costing —ATA (1955), ATA (1960), SBAC and those of four airlines



BRITISH AIRCRAFT CORPORATION

ONE HUNDRED PALL MALL LONDON SW1 ENGLAND

TGA 845.8

a simple three-step plan for

1 2 3

AIRCRAFT LEASING

SELECT THE AIRPLANE YOU WANT FROM THE DEALER OF YOUR CHOICE

Under the new simplified lease plan, you shop for the airplane that meets your requirements. You order it from the dealer of your choice just as you would on a direct company purchase.

WE BUY THE AIRPLANE FOR YOU WITHOUT DEALER RECOURSE

Our check pays for the entire sales price of the aircraft. We require no dealer endorsement. You assume full operating control just as you would on a company owned aircraft.

A REALISTIC MONTHLY PAYMENT INCLUDES INSURANCE
NO LARGE DOWN PAYMENT

You are not required to make a large initial payment. Your first payment amounts to only two regular monthly payments. Under this new leasing plan, your company immediately enjoys the advantages of aircraft usage without tying up capital.

Ask for our free booklet "A New Concept in Aircraft Leasing"

AIRCRAFT LEASE-CHARTER, INC.

HANGAR #2, TULAKES AIRPORT • SUnset 9-3667 • BOX 7363 • OKLAHOMA CITY

WITH THE NEW SPARTAN BRAKE BOOSTER SYSTEM

- No creeping on engine run-up
- Less effort for pilot
- Positive braking action
- Easy installation
- Total installation weight — 3 lbs.
- FAA-STC No. SA2-1191 — PMA approved

This great new system will fit Beech aircraft models TC-45H, C-45H, TC-45G, C-45G, G-18S, D-18S, E-18S.

SPECIAL NOTICE
The Spartan Brake Booster system can be installed while you are at the NBAA convention.

AVIATION SERVICE DIVISION
sparlan AIRCRAFT COMPANY / TEmple 5-4491 / Municipal Airport / Tulsa, Oklahoma

AIR REPORT

(Continued from page 5)

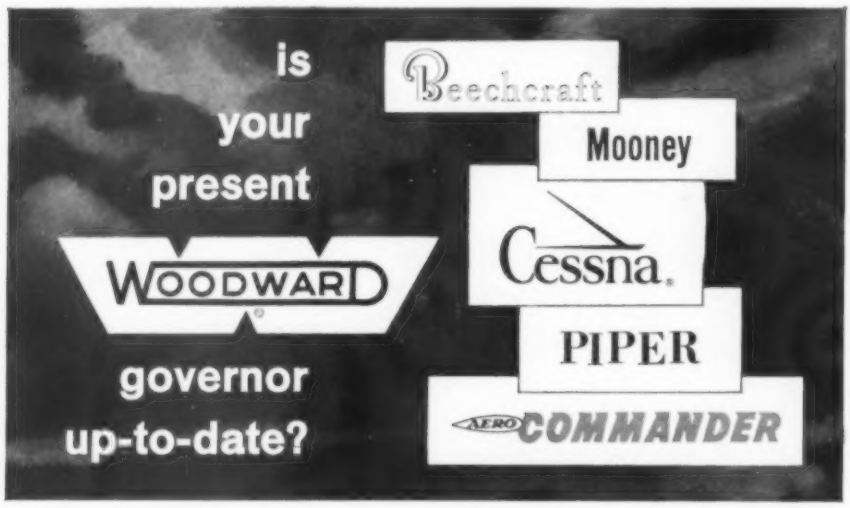
Bayer of Hughes said a little Hughes copter will be FAA certificated.

NEW STANDARD INSTRUMENT DEPARTURE PROCEDURES, went into effect recently at Idlewild Airport to simplify pilot-controller coordination of departure instructions. Known as SID's, the new procedures are presented to pilots as charts giving air traffic control clearance and showing routes of departure, altitudes, radio fixes and related information in a pictorial manner. A pilot requests his departure clearance using code words and the controller issues it by code. Length exchange of communications is eliminated. Charts are being developed for other airports.

FAA WILL CONDUCT 90 AIRSHARE "HANGAR-FLYING" MEETINGS WITH GENERAL AVIATION PILOTS throughout the nation on Saturday, Oct. 21 to discuss changes in the Civil Air Regulations. Proposed changes will be available in the form of a "notebook" after Oct. 1 from FAA offices. Local FAA aviation safety inspectors will conduct the meetings.

NEW LOW-PRICED AUTOPILOTS were announced late in August by Mitchell Industries and Tactair. . . . **NEW MITCHELL EXECUTIVE II AUTOPILOT,** priced at $995, operates both roll axis and azimuth axis through improved transistorized amplifier and light weight servo system. Control unit is integral part of the amplifier and contains all controls and mode selector. The 3.5-lb. Mitchell uses both the directional gyro and artificial horizon for stability and accurate heading control. Control unit measures 3¾ ins. wide, 2 ins. high and 5 ins. deep. Deliveries will begin in October. . . . **NEW TACTAIR T-101,** priced at $495, is pneumatically operated, uses suction-operated bellows or servos to control the ailerons, similar to the system successfully

(Continued on page 19)



S-106

Let Woodward make it as modern as those coming off today's assembly lines

Your propeller governor can be brought completely up to date by remanufacture to incorporate all of the engineering improvements which have been made over the dozen years of production of this type governor. Twin engine synchronization and single engine steady state performance have been improved by a new sleeve type pilot valve plunger with superior damping characteristics which is now in production for most aircraft models. This new valve can be incorporated, along with other improvements, in your old governor. An unfeathering component can be added as an integral part of twin engine governors for use with an unfeathering kit that permits safer engine failure simulation. New speed control heads solve wear problems which have existed in some installations using cable controls. Woodward's "exchange bank" saves you time and money. Just tell us when you're ready to change governors and we'll ship you a completely modernized unit with a new equipment warranty. You install it and send your old governor to us. The cost? — a flat exchange price that covers remanufacture of your old governor for our stock. Write for full information today!

WOODWARD GOVERNOR COMPANY

ROCKFORD, ILLINOIS

FORT COLLINS, COLORADO • SCHIPOL, NETHERLANDS • SLOUGH, ENGLAND

WORLD'S OLDEST AND LARGEST MANUFACTURER OF HYDRAULIC GOVERNORS EXCLUSIVELY

Airmen's Calendar

Sept. 16-17—Aerorama '61 Air Power Exposition, sponsored by Dallas-Fort Worth Jaycees and Texas Air National Guard, Hensley Field, Dallas.

Sept. 17—6th Annual Jaycees Show with Bill Sweet's National Championship Air Show, Midland, Texas.

Sept. 20-24—Air Force Association's National Convention and Aerospace Panorama, Philadelphia.

Sept. 26—14th Annual New York State Airport Development and Operations Conference, Hotel Utica, N. Y.

Sept. 26-28—National Business Aircraft Association Annual Convention, Mayo Hotel, Tulsa.

Sept. 28-Oct. 1—National Pilots Association Annual Meeting and Flight Forum, Western Hills Village, Tulsa.

Oct. 3-5—1961 National Airports Conference, University of Oklahoma, Norman, Okla.

Oct. 4-6—FAA Flight Service Specialists Annual Convention, Skirvin Hotel, Oklahoma City.

Oct. 4-6—National Association of Air Traffic Specialists First Annual Meeting, Oklahoma City.

Oct. 7-14—13th Annual All-Texas Air Tour, Details from Texas Air Tours, 307 Walton Bldg., Austin, Tex.

Oct. 8-10—25th Annual Convention, International Aviation Council, Davenport Hotel, Spokane, Wash.

Oct. 9-11—Airport Operators Council Mid-Year Conference, Hilton Hotel, El Paso.

Oct. 10-12—14th Annual Indiana Aviation Conference, Turkey Run State Park, Marshall, Indiana.

Oct. 23-24—Cessna Aircraft International Sales Meeting for Distributors and Dealers, Wichita, Kansas.

Oct. 30-Nov. 1—6th Annual Meeting Air Traffic Control Association, Deauville Hotel, Miami Beach.

Nov. 1-2—Mooney Aircraft's Annual Distributors Meeting, Kerrville, Tex.

Nov. 6-17—15th Annual Institute on Air Transport Management, American University, Washington, D. C.

Nov. 8-9—Piper Aircraft International Sales Meeting, George Washington Hotel, West Palm Beach, Fla.

Nov. 11—Free Fly-In Breakfast and Airmen's Reunion, with Trophies, Antique planes, Homebuilts and Air Show, Fairview, Okla.

Nov. 28-30—38th Meeting, ADMA, Jung Hotel, New Orleans.

some plain talk about the GRUMMAN GULFSTREAM and the competition

UTILITY

More than 70 Grumman Gulfstreams are now in use, proof enough of its performance and acceptance. Largely responsible for its corporate acceptance is the aircraft's phenomenal utility — where it can be landed — a fundamental requirement of any business aircraft.

For example . . .

The Gulfstream's short field performance — proven in world-wide use — brings all of the nation's 1,787 public airports with runways over 3,000 feet within its utility area. This includes all airports with jet restrictions. While we don't recommend it, we have demonstrated full gross weight take offs and landings in substantially less than 1000 feet. Relating airports and runway lengths to speed and time savings, it becomes obvious that the in-flight time saving of jet aircraft can be substantially or totally lost due to the necessary use of less convenient airports.

PRACTICALITY

From a practical viewpoint the Gulfstream is a sound investment. The life of the aircraft has just begun, and though it is completely new in design and construction, improvements can logically be anticipated. Conversely, re-manufactured piston-powered comparable aircraft are at the end of their major development "ropes".

COST

Enough experience and statistics on the cost of operating Gulfstreams are now available to show that the direct operating cost is comparable to that of the DC-3.

Estimating ownership costs requires consideration of obsolescence. The resale value in 1971 of a $1,180,000 Gulfstream versus that of an $800,000 piston-powered comparable aircraft is anybody's guess. But, for reasons of obsolescence and the accelerating phase-in of turbine power, we believe the piston-powered aircraft will have substantially less value, even on a percentage basis. Consequently, the true ownership cost of the Gulfstream will be less than the initially lower-priced aircraft.

RECOMMENDATION

If you are considering a high-speed pressurized aircraft, may we discuss with you the Gulfstream success story and the facts supporting it? We'd like to show you how the combination of the Grumman-built Gulfstreams, plus exceptional airborne electronics and interiors by Atlantic, provide the answer to the question of which airplane should be yours. Our demonstrator will be at your service.

Atlantic Aviation CORPORATION

founded 1927

Gulfstream Distributor

Beechcraft Distributor

World Leader in Gulfstream Sales and Service

ATLANTIC AVIATION CORPORATION
Greater Wilmington Airport
Wilmington 99, Delaware • East 8-6611

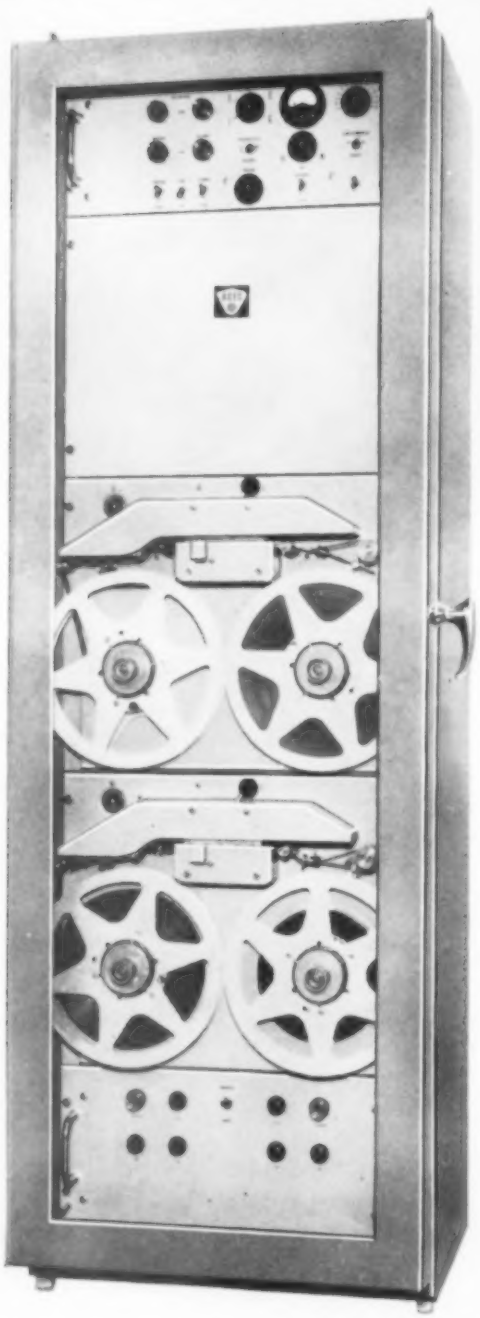
ATLANTIC AVIATION EXPORT COMPANY, LTD.
London, England

AIRCRAFT SERVICES

sales • financing • custom interiors • custom electronics • pilot training • maintenance • service • engine exchange

LOOK TO ATLANTIC FOR LEADERSHIP IN BUSINESS AVIATION

5 SQUARE FEET ARE ENOUGH TO RECORD ON



15 TRACKS DURING 48 HOURS

ACEC GT-machines record radiotelephone traffic control communications...
...6 channels on 1/4 in. (6,25 mm) tape
...15 channels on 5/8 in. (16 mm) tape...

TECHNICAL DATA

Reduced dimensions = Depth : 23 in. (54 cm)
Width = 33 in. (8 3cm) with 14 in. spools 25 in. (65 cm) with 10 in. spools
Height : 74 in. (188 cm)
Instant servicing with the aid of printed circuits plug-in type amplifiers
Alarm device on each amplifier unit with automatic warning in case of any trouble
Alarm device and automatic change-over switching in case of trouble either in the mechanism or in the tape running
Automatic gain control (AGC) provides an excellent S/N ratio for a 40 db range of the input signal
Two separate adjustable inputs for each channel
Permanent magnet eraser included in the machine
Voice operation up to six channel machines
Monitoring on each channel for rapid checking of recorded signals

PRACTICAL ADVANTAGES

Use of standard component parts complying with MIL, JAN, CCTU, DIN, specifications
Long life industrial tubes, 10.000 hours guarantee
Fully tropicalised execution
Very simple manipulation, placing of tape very rapid and easy

ALL COMPONENTS COMPLETELY ACCESSIBLE...
MODIFICATIONS POSSIBLE IF DESIRED
FOR SPECIAL REQUIREMENTS

ATELIERS DE CONSTRUCTIONS ÉLECTRIQUES DE CHARLEROI

Société Anonyme - BELGIUM

ACEC
CHARLEROI

A LOW PRICED FOUR-PLACE PLANE

WITH LOW WING STABILITY, LANDING EASE, VISIBILITY

Now, at last, the features you could only get previously with much more expensive airplanes are yours at lowest price in the Piper Cherokee, features possible only with modern low wing. To name a few — wide-tread tricycle landing gear and low center of gravity for the hug-the-road stability on landings (where it counts) . . . amazing "ground cushion" approaches . . . safety visibility (no blind spots in the turns) — all thanks to the Cherokee's low wing.

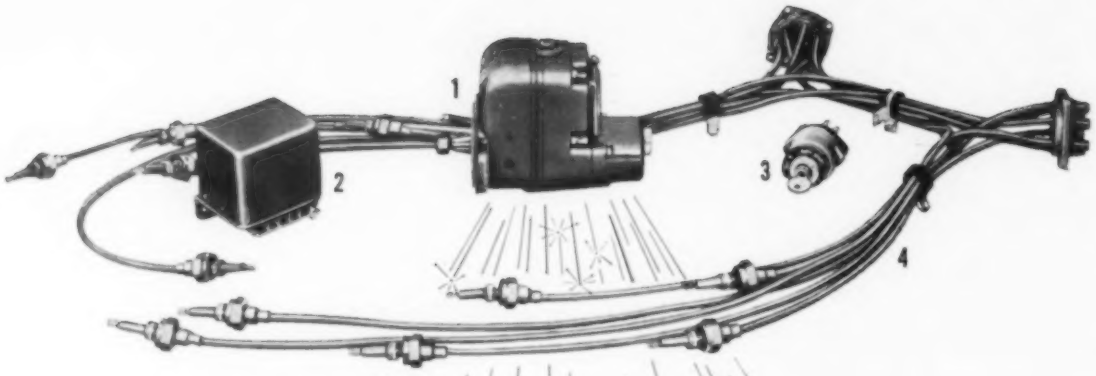
In other ways, too, the Cherokee's low wing puts this new all-metal, four-place plane years ahead of competition. Its clean, cantilever, laminar-flow design gives best all-around performance—quick take-off, excellent climb and over 130 mph on economical power (Lycoming 150 or 160 hp). And even more important are the easy-to-fly characteristics that have drawn raves from flight test pilot-writers evaluating the Cherokee.

Don't settle for anything less than a modern, *low wing* Cherokee. Prices start at $9795. See your Piper dealer or write for Cherokee brochure, **Dept. F-9, Piper Aircraft Corporation, Lock Haven, Pa.**

YOU'LL BE AMAZED at the Cherokee's big, big cabin, almost as big as the Comanche (and that's the biggest of all single-engine 4-place planes!) Big 19-cubic foot baggage compartment, too.

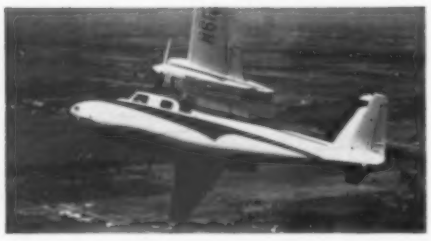
PIPER

Cherokee



Instant ignition... through a shower of sparks

BENDIX S-200 IGNITION EQUIPS 80% OF NEW U. S.-BUILT BUSINESS AND PRIVATE AIRCRAFT



BENDIX S-600 LOW TENSION IGNITION HELPS SET NEW ALTITUDE RECORD. Jerrie Cobb, first woman candidate for space flight, flew an Aero Commander to a world altitude record of 37,010 feet last September 20. In her record-smashing flight, officially sanctioned by national and world aeronautic authorities, her aircraft was equipped with a dependable Bendix S-600 low tension ignition system.

Builders of fixed wing aircraft and helicopters, using four and six cylinder engines, have been quick to specify the Bendix® S-200 ignition system because of its easier starting, smoother running, and greater durability. It is now used on four out of five new business and private aircraft.

Quicker, surer starting is accomplished through a new concept in high tension ignition for aircraft. The ignition-starting energy formerly supplied by release of a mechanical impulse coupling is replaced in the S-200 system by a retard breaker and battery-operated starting vibrator which produce a "shower of sparks" at the spark plug. A completely new type of ignition switch automatically controls starting and operation of the ignition system. Radio shielding is improved on the S-200 system through use of the Bendix "feed-thru" capacitor feature.

Aircraft operators wanting the advantages of the S-200 system may obtain it to replace present ignition and are invited to contact Scintilla Division distributors regarding installation, price, and delivery.

1. Retard breaker magneto 2. Starting vibrator 3. Ignition and starter switch 4. Harness assembly

Scintilla Division
SIDNEY, NEW YORK

THE Bendix CORPORATION

AEROJET STANDBY ROCKET ENGINES

for PROFIT and SAFETY

Whether you fly reciprocating engine or turboprop aircraft, Aerojet rocket engines permit you to fly:

- with higher payloads
- with more range
- with greater safety
- from short fields
- from high elevations
- over high obstacles
- at high temperatures

Aerojet Standby Rocket Engines Inspire Pilot and Passenger Confidence

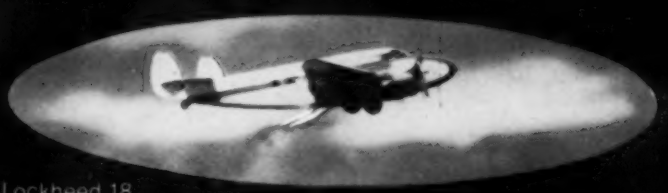
COMMERCIAL SALES

Aerojet-General
CORPORATION
Azusa, California

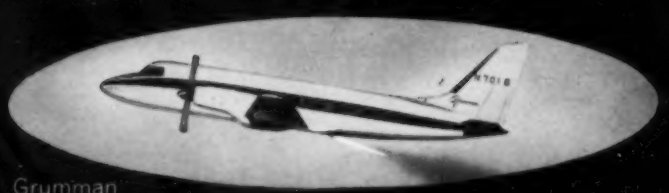
A subsidiary of The General Tire and Rubber Company

Beech 50

Beech 18



Lockheed 18



Grumman Gulfstream

Douglas DC-3

Fairchild F-27

Convair (240, 340, 440)

YOU CANNOT AFFORD TO FLY WITHOUT AEROJET STANDBY ROCKET ENGINES!

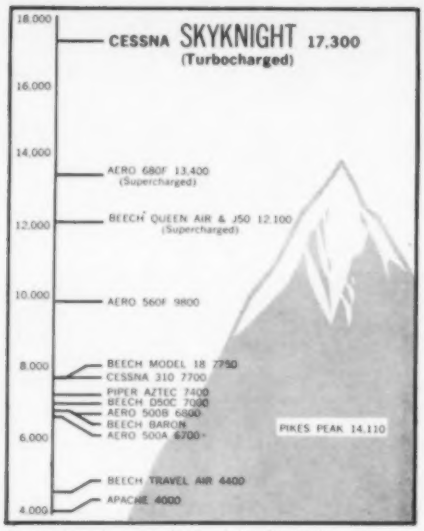
ANNOUNCING THE WORLD'S FIRST TURBOCHARGED BUSINESS TWIN: CESSNA'S SKYKNIGHT

Cessna's turbocharged Skyknight flies at 27,200 feet and maintains full 520 h.p. at 16,000 feet. It's the only light twin that clears Pikes Peak (by 3,000 feet) on one engine. Price? $30,000 less than any other high-altitude twin.

See column next page—and then your Cessna dealer. At the airport, look for the Cessna pennants, sign of extra Cessna service at over 375 dealers around the world. Here: Sun Valley Air Service, Phoenix, Arizona.

SKYKNIGHT 310
THE EXECUTIVE TWI

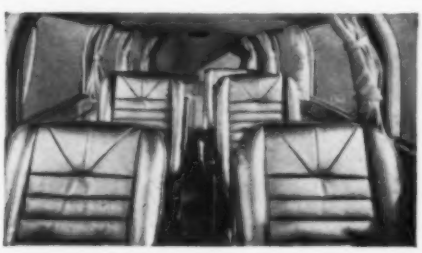
MEN WHO KNOW AIRPLANES FLY CESSNA



Figures based on manufacturer's handbook data at gross weight—standard conditions.

TURBOCHARGED SKYKNIGHT—the only light twin that can clear Pikes Peak on one engine with over 3,000 feet to spare.

Cessna's turbocharger takes in thin air . . . compresses it to sea-level density . . . and packs it into both fuel-injection engines. *Result:* each engine maintains full 260 h.p. up to 16,000 feet. You get speeds up to 265 m.p.h. . . . a nonstop range up to 1,430 miles with auxiliary tanks . . . and an over-the-weather service ceiling of 27,200 feet *—17,300 feet on one engine.*



A QUIET, LUXURIOUS 5-PLACE CABIN lets you work or relax in complete comfort. Plenty of room to stretch out or move around. (One example: you get 3½ inches more cabin height than in the popular Cessna 310.) Four big windows on each side give you panoramic view. And you can choose from 4 seating plans and 4 interior color schemes.

PRICE? Just $67,500. And a new plan at your Cessna dealer's makes it even easier to buy. One example: you can buy a new Cessna 150 for as little as $750 down—including *free* flying lessons.

FOR A DEMONSTRATION FLIGHT, call your Cessna dealer now. (See Yellow Pages.) Look at all 13 models . . . starting at $7,495. Lease plans also available. Or for further information, write: Cessna Aircraft Co., Dept. FM-12, Wichita, Kansas.

All prices with std. equip., f.a.f. Wichita

CESSNA

13 BUSINESS AIRCRAFT

AIR REPORT

(Continued from page 12)

used for years in the Tactair T-3, and a vacuum-driven single-rotor inertial guidance element. Entire unit weighs 4 lbs., contains only 5 moving parts and three basic elements — two aileron-actuating bellows and the combination sensing and command control unit. Latter measures 3¾ ins. wide by 2¼ ins. deep.

AMERICAN AIRLINES HAS ORDERED 25 THREE-JET BOEING 727 AIRLINERS with deliveries in 1964-65. Total order, including spares, cost $131.5 million. They will be used as short-range jets, carrying 70 to 113 passengers.

VAN DUSEN AIRCRAFT SUPPLIES HAS ACQUIRED GENERAL AVIATION SUPPLY CO., known as Gasco, as a wholly-owned subsidiary.

NEW OX5 CLUB NATIONAL OFFICERS, elected last month at Wichita, include E. A. (Pete) Goff, immediate past president of the Early Birds, as president; George Halderman, first vice president; Art Chapman, second vice president, and Clifford Ball, re-elected secretary-treasurer.

AERO COMMANDER 560F was awarded first place in the twin-engine class at the recent International Business and Touring Aircraft Competition in England, organized by the Royal Aero Club in cooperation with the British Business Aircraft Users Association and conducted under FAI and Royal Aero Club regulations. As best executive twin, winner was selected on basis of points scored for economy, range, speed, comfort and noise level, equipment, seating capacity, baggage capacity and short-field performance. The 560F is powered by two fuel-injected IGO-540-B1A engines rated at 350 hp. each for take-off.

NEW RCA AVQ-20 AIRBORNE WEATHER RADAR SYSTEM, operating on the X-band, makes maximum use of transistorized circuits, scans 180 miles ahead of the aircraft instead of 150 miles with currently-available systems, and has only three basic units — antenna (12, 15, 18, 24 or 30-in. size), receiver-transmitter, and indicator, and has a total weight of only 45 lbs.

LONG-RANGE "CONSOL" NAVIGATION AID is being installed by FAA at Miami to reduce the gap in radio navigation facilties coverage over the North and South Atlantic, Gulf of Mexico and the Caribbean in addition to giving coverage off the East Coast. . . . **NEW VISUAL GLIDESLOPE INDICATOR LIGHTS** will be installed by FAA at 37 additional airports.

NEW LIGHTPLANE TIRE by Aircraft Components, Inc., Benton Harbor, Michigan, has increased rubber tread at the outside edge of the tire and flatter profile.

STANDARD PRODUCTS OUTLETS at Tulsa, Denver, Wichita and Kansas City will operate under the name of Air Associates, Inc., parent firm.

WILLIAM P. LEAR reports from Geneva, Switzerland, that his Swiss American Aircraft Corporation is far enough along on its twin-jet corporate transport development to release twenty-five airplanes for production and that another fifty will be scheduled before the end of the year. Lear stated in a telephonic conversation with FLIGHT MAGAZINE: "By scheduling production even before the prototype flies next April, we'll be able to deliver at least seventy-five units in 1963." General Electric CJ-610-2 engines will furnish the power.

NEW HELICOPTER CHARTER-CONTRACT OPERATION is Washington-Baltimore Helicopter Airways, Inc., which has filed CAB application for scheduled passenger service between the two cities and area airports. With a paid-in capitalization of $1.3 million, new helicopter airline is headed by James G. Ray as president and director. A rotary-wing pioneer, Jim Ray was a founder of Eastern Airlines, Allegheny Airlines and Pacific Airlines and was associated with the design of the Pitcairn autogyro, piloting it when it landed on the White House lawn in 1931 to receive the Collier Trophy from President Hoover, which Ray shared for his contributions in design and operations.

CIVIL AERONAUTICS BOARD'S most recent statistical review of general aviation accidents covers the calendar year of 1959 and reveals no new trends in the pattern of accidents. Accidents in 1959 totalled 4,576 with 450 of them fatal, killing a total of 823 persons. In 1958 there were 4,591 accidents of which 398 were fatal, killing 731 persons. Hours flown (estimated) were 12.4 million in 1959 as against 11.7 in 1958. Continuing to fly VFR under instrument conditions, operating recklessly, exceeding ability and failure to maintain flying speed (stall-spin) continue as in past years to head the list of causal factors.

NATIONAL AVIATION TRADES ASSOCIATION, composed primarily of sales and service companies on airports, has recommended to Secretary of Commerce that a third level of air carriers be established in order "to provide regular but unsubsidized air transportation to communities not served by trunk and local carriers." Other recommendations covered safety regulation, short and long range airport development, rule making policies and abandonment of the "user charge" principle of taxation.

SALUTE!

To Our Teammates on the Supply Line

AIRHAVEN, INC., Redbird Airport, Dallas, Texas

SALUTE! On modern, growing Redbird Airport — a City of Dallas property dedicated to business and industrial flying — modern, growing Airhaven is headquarters for hospitality and service. C. E. (Jet) Jetton, VP-Genl. Mgr., reports 60 aircraft permanently based there, with individual hangars accommodating 40 of them. This progressive Piper dealer features around-the-clock line service, with Humble gas and oil, for those taxiing up on Redbird's 3,800′ and 4,450′ night-lighted, concrete runways (control tower under construction). Aircraft rental and charter is a popular feature — as is Airhaven's deluxe, air-conditioned pilots' lounge. Jetton and his mates know they can depend on Southwest Airmotive for factory-new parts to meet every need.

SPARTAN AVIATION SERVICE DIV., Municipal Airport, Tulsa, Okla.

SALUTE! FAA Approved Repair Station No. 50, this key division of Spartan Aircraft Co. features plus-service and firm overhaul prices. Centrally-located in the heart of Soonerland, Spartan performs all types of quality conversion, maintenance, overhaul, instrumentation, radar, and painting. The conversion shop, specializing in executive aircraft design and modification, is one of the nation's most modern, having served business, commercial, and military aviation since 1928 with complete,one-stop service. Pictured, left to right, are: Charles A. Richards, sales mgr.; Paul Renskoski, customer rep, and B. B. Broome, sales rep. They rely on Southwest Airmotive in solving many of their problems of supply.

TEXAS AIRMOTIVE CO., Dallas Garland Airport, Dallas, Texas

SALUTE! Versatility, combined with efficiency and experience, has a lot to do with the fact that 133 aircraft are based permanently with Texas Airmotive. Pres. John H. Huett, well-known in aviation circles throughout the southwest, has operated an approved flight school for 15 years. Today, as a go-gettin' Cessna dealer, his activities also include charter, maintenance and radio shops, Gulf fuels and lubes, new and used plane sales, auto rental, and top-level transient service. The company offers 122.8 unicom for those using the field's 3,400′ and 2,600′ lighted, hard-surface runways. The men of Texas Airmotive and the men of Southwest Airmotive cooperate closely in seeing that there are no logistical bottlenecks.

THE DISTRIBUTION DIVISION

Southwest Airmotive Company

Serving America's Heartland with Flying's Finest Supplies

SERVICE CITY U.S.A.

KANSAS CITY • ST. LOUIS • DALLAS • DENVER • HOUSTON

EDITORIALS

NBAA and NPA at Tulsa

A REVIEW of aviation's calendar of forthcoming events reveals a wide selection of interesting and informative meetings, gatherings and conventions. Among the most prominent and productive will be the National Business Aircraft Association's 14th annual forum in Tulsa, September 26 to 28, followed immediately by the National Pilots Association annual meeting in the same city.

NBAA's annual meeting and forum has developed in recent years into the finest showcase of general aviation aircraft and equipment in the nation. By moving the meeting around the country, the citizenry of each host town becomes more aware of utility aviation through the annual flying and static display which is open to the public. No other civil aviation function performs as valuable a service.

This year more than 30 different aircraft manufacturers have indicated they will show their latest designs, from helicopters to turbojets. While the aircraft usually prove to be the main conversation pieces, the NBAA display is particularly important from the standpoint of unveiling the latest in electronics and accessories.

We commend the NBAA and NPA annual meetings to all airmen because both are open to everyone interested in aviation, regardless of membership affiliation. While NBAA's program is geared to the corporate type of owner, NPA's will appeal to the private or individual owner and pilot. In these changing times it's important to attend such meetings, become acquainted with technical progress and mix and mingle with industry and government leaders who are in the know. See you in Tulsa!

Unfair Competition?

A GROWING number of aviation shops are beginning to complain about certificated airlines going into competition with them in the overhaul, modification and servicing of aircraft, engines, electronics, gear and accessories. The principal charge is that the airlines are subsidized and therefore the taxes a commercial shop pays to the government are financing destructive competition.

In some areas this assessment of the situation is correct, especially in the case of subsidized local service carriers. However, the major trunk lines, while protected by subsidy allocations if ever needed, have not been on subsidy for many years. Airlines in the category of Mackey out of Florida have no mail pay or subsidy, whatsoever, actual or implied.

Purely commercial non-airline shops specializing in the field of larger corporate type executive transports have a right to be concerned. Government-certificated airlines usually enjoy a reputation for excellent maintenance work. It's a symbol of quality that many corporate executives are inclined to take for granted. The commercial non-airline shop on the other hand has no "automatic" symbol and must build a reputation over a period of years and by the expenditure of sales effort and advertising.

You can't blame the local carriers for trying every possible angle to increase their income and reduce their dependence on subsidy. They are under pressure. However, we do not believe subsidy dollars should go into the financing of facilities competitive to free enterprise shops. There is no law to stop airline operators from engaging in such activities; but Civil Aeronautics Board accounting practices and policies should separate such activities from any connection with subsidy dollars, whatsoever, even to the point of considering them completely separate enterprises.

We feel the certificated, mail-carrying airlines have little business in the field of outside commercial aircraft repair, maintenance and installations. Their primary purpose is to haul people, mail and cargo. They are creatures of Federal legislation. But whether they continue to push into this field, and whether or not the Civil Aeronautics Board defines their liberties and actions in this field, the fact remains that there's no law against it and in the final analysis the

customer is the boss. He pays his money and takes his choice. The old, established, non-airline commercial shops must prove they can serve the customer better than the airlines can, that they are primary specialists whereas such work is secondary or auxiliary to airline operations.

Productive Public Relations

IT'S about time a suitable verbal tribute is paid to a master at aviation public and press relations, Al Harting of Southwest Airmotive, who last month significantly rounded out fifteen highly productive years with his company by opening "Service City, USA" at Dallas Love Field.

True to the Harting genius, everybody came and nobody was bored. All the big-wigs of the town, including the Mayor and the City Council, the city government and airport officials, the Chamber of Commerce aviation committee and all the press media. The affair, which lasted but one hour on a hot August afternoon, revealed how aviation public relations can be productive when a certain amount of imagination is mixed with facts. It's true that Harting had a solid "story" to tell with the newly conceived Service City project; but without his flair for showmanship, and the respect of the press and community leaders he unquestionably holds, we doubt if many chairs would be filled or one photo taken or one line written for the papers.

General aviation enterprise needs more solid press and public relations based on the Harting formula of facts and information made attractive by imagination and window dressing, with a sprinkling of good humor for good measure. Having worked as an aviation journalist prior to his Air Force service in World War II, it's apparent that Harting hasn't forgotten what it's like on the other side of the desk.

The competition for space in all publications and on TV and radio is about as tough as competition in any line. This space and time can not be bought. Stories or news for release must have merit, punch and be of public interest and significance. The day of publicity for publicity's sake is gone. It's an unwanted item and it won't sell. But those of us in the airplane world, particularly in the general aviation field, know we have a veritable garden of news and stories at every corner. Trouble is, there are not enough professionals capable of digging them out, properly presenting them and getting them published or on the air.

Harting's record in actual production is something of a national phenomenon. No company in general aviation has had as consistent and as sustained a public relations policy under the guidance of one man as long as Southwest Airmotive. It's an interesting, unique case, and while the kudos go to Al Harting, news dispenser, impressario, showman and press agent par excellence, a lot of credit must go to his company executives. They have long realized how vital and important intelligent public and press relations are to a growing organization in a growing industry. The formula is not a secret one. We heartily recommend it for all who recognize its value, especially since Harting and Company have always served aviation and the community first, their own interests and purposes second. This has accomplished far more than if they had followed a purely selfish formula seeking publicity. General aviation needs more Al Hartings.

AERIAL APPLICATION OF FERTILIZER is conducted on a large scale in New Zealand, where over 60 Fletcher FU-24 agricultural aircraft such as this one are operating. Fletcher Aviation Corp. of El Monte, California, builder of the high-performance ag plane, reports six FU-24's of Robertson Air Service at Hamilton, New Zealand, applied 38,000 long tons of fertilizer in a single year. One of them spread 230 long tons in over 300 flights in a single day. FU-24 has 240-hp. Continental engine, 1,610-lb. useful load with an empty weight of 1,890 lbs., has 40-G cockpit "safety zone," 42-ft. span, length of 31 ft. 10 ins. and 9.3-ft. height.

BRITTAIN AUTOPILOT

Just one gyro... not two... in the revolutionary Brittain Autopilot! With the exception of the Brittain, all top quality autopilots rely on **two** gyros: D.G. and Horizon. With the Brittain Autopilot... just one DF-2 Gyro senses changes in **both** direction and attitude... meters corrections to smoothly guide your craft. Equally important, Brittain's tumble-proof DF-2 (dual-function, drift-free) gyro is independent of your existing gyro instruments ...so that your Brittain Autopilot will operate even if your flight instruments fail. In addition, thousands of flying hours during the past 3 years have proven the Brittain Autopilot to be virtually maintenance-free. With basic 2-axis systems priced from $795-$1395 complete, the ingenious single-gyro Brittain Autopilot costs hundreds of dollars less than comparable two-gyro units. FAA approved for practically all civilian aircraft, single and twin engine. Write today for free Technical Booklet. Please state make and model of aircraft and name of your regular dealer. BRITTAIN INDUSTRIES, INC., Fuel Navigation & Guidance Systems, 463 North Prairie Ave., Hawthorne, Calif.

LOWEST INITIAL COST • LOWEST OPERATING COST • 180 MPH CRUISE • NO. 1 IN SALES

#1

first in sales for retractables!
. . . for June and July

OFFICIAL AIRCRAFT SALES (A.I.A.)						
aircraft model*	MOONEY MARK 21	COMANCHE 180	COMANCHE 250	BEECH DEBONAIR	CESSNA 210	BEECH BONANZA
June Sales	28	9	24	11	15	25
July Sales	30	7	21	7	9	20

*listed in order of advertised price

In just six months, since the introduction of the sleek, all metal MOONEY MARK 21, it has gained the number one spot in sales for all retractable-geared models. More and more people are discovering Mooney's high speed performance (180 mph cruise), and low operating cost. See the new all metal Mark 21 — lowest in intial cost, lowest in operating cost, and No. 1 in sales! • Write for the Mooney Comparison File and prove to yourself — why Mooney's the best buy!

Mooney has accomplished this outstanding sales record with more than 50% of the available sales territory open. The Mark 21 is only the first of a series of outstanding models "on the way"! Are you overlooking an opportunity?

MOONEY *Aircraft Inc.* • *Kerrville, Texas*

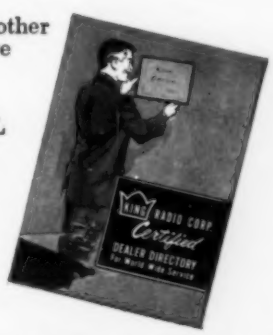
ONE FULL YEAR WARRANTY

on ***all*** parts and components ***plus*** a warranty on labor for the first ninety days

King Engineering has proved so sound—King Quality Control has proved so effective that *one full year warranty* now stands squarely behind every part and component in all equipments now being produced by King Radio Corporation, plus a warranty on labor for the first ninety days.

This warranty includes tubes and transistors, **a feature never before offered by any manufacturer of aircraft radio equipment.**

Your King Certified Dealer (the expert who installs your equipment) or any other of the King Certified Dealers listed in our new world-wide Directory will give you prompt, qualified service wherever you are.



See your King Certified Dealer today for full information on this ONE FULL YEAR Warranty—and ask him for your copy of the King world-wide Dealer Directory so that wherever you fly you will know the King Certified Dealer who is nearby; or write direct to King Radio Corporation, Olathe, Kansas for your copy. Contains all King Certified Dealers, world-wide, plus complete information on the New ONE FULL YEAR WARRANTY.

KING KING RADIO CORP.
OLATHE, KANSAS

Sold through Certified Dealers throughout the U. S. and Canada. Export by REA International, 80 Broad St., New York City.

© 1961, KING RADIO CORP.

Builders of TOMORROW'S Aircraft Equipment TODAY!

A LOT DEPENDS ON

YOUR POINT OF VIEW

America's lowest priced at

$19,950 F.A.F.

If you are a profit minded dealer or distributor looking for new opportunities to make a greater return, then consider these points:

1. As a Brantly dealer you become part of the fastest growing phase of aviation — the helicopter industry. **2.** A helicopter training program with as few as 10 students will make you a return to pay for your B-2— it's all profit thereafter. **3.** The Brantly B-2s dependability and safety has been proven by nearly 150 deliveries in just over 2 years. **4.** Operating and maintenance costs are comparable or less than single-engine fixed wing aircraft. **5.** Sales opportunities are expanding. We receive dozens of inquiries daily, many in your area. Our national advertising program is pre-selling the B-2 for you. **6.** Factory arranged financing can be obtained in many cases.

Write today for your brochure describing the Brantly B-2 helicopter

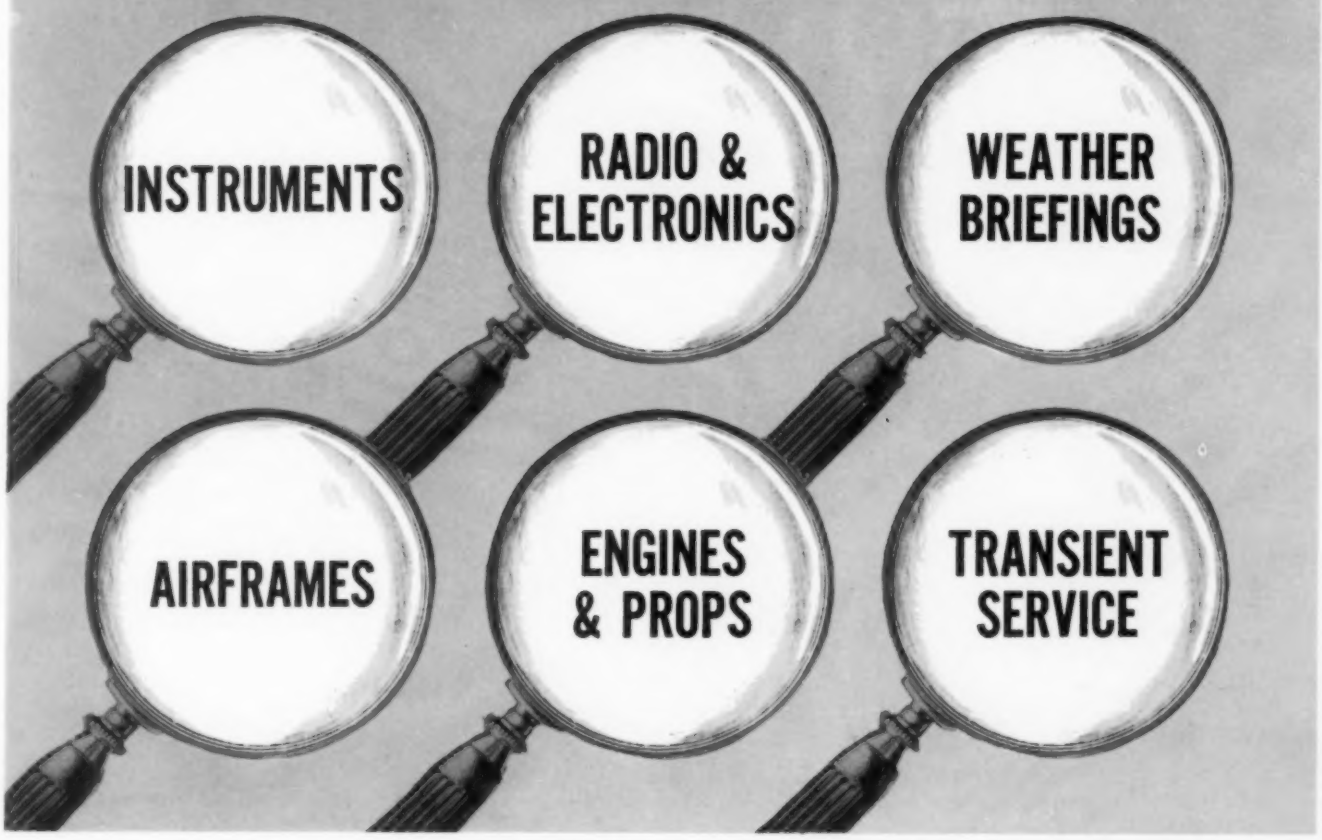
BRANTLY HELICOPTER CORPORATION

DEPT. X, DREAM'S END 3, ELKHART, INDIANA

Brantly B-2

SERVICE CITY, U.S.A.

Where Individual Specialization Means Sharpest Service Focus!



In the hands and under the eyes of separate, but cooperating, specialist-companies, everything in the realm of business airplane service becomes sharper and more-clearly-defined – management, experience, equipment, and personnel. This is the reality of Service City, USA, a one-location community of complete, in-focus specialization!

SERVICE CITY *Cindy:*
Meet Her at the Information Bureau in Our Main Lobby

Under the formerly-accepted concept — in which a single company endeavors to be all things to all airplanes — "One Stop Service" too often is on the blurry side.

THE BEST ADDRESS FOR **SPECIALIZED** *ONE-STOP SERVICE*

SERVICE CITY, U.S.A.

At Southwest Airmotive, Love Field, Dallas, Texas

- AERO INSTRUMENT SERVICE-SALES, INC.
- ASSOCIATED RADIO SERVICE CO.
- EXECUTIVE AIRCRAFT SERVICE, INC.
- SOUTHWEST AIRMOTIVE COMPANY
- UNIVERSAL WEATHER SERVICE

Lightweight pneumatic De-Icers installed on IBM Corporation's Aero Commander help in planning trips when icing is a possibility. And flight personnel report that actual performance of the boots is excellent—and maintenance simple. This reliability is an important factor in logging an average of 5800 miles per month for transporting business personnel.

GET POSITIVE ICE PROTECTION ON YOUR LIGHT TWIN-ENGINE AIRCRAFT

BFG LIGHTWEIGHT PNEUMATIC DE-ICERS—Weigh approximately 60 pounds. Operation is pneumatic, with a compressed air reservoir providing enough energy for up to 7 hours of de-icing between charges.

ELECTRICAL PROPELLER DE-ICER—Complete kit weight approximately 10 pounds; low power requirements. Current is cycled automatically for effective de-icing.

Contact your B.F.Goodrich Aviation Products Distributor, or write B.F.Goodrich Aviation Products, a division of The B.F.Goodrich Company, Akron, Ohio.

ALABAMA
Birmingham
Aeromarine Supply
ARIZONA
Phoenix
General Aviation Supply Co.
CALIFORNIA
Burbank
Pacific Airmotive Corp.
Hawthorne
Sky Store
Oakland
Pacific Airmotive Corp.
COLORADO
Denver
Southwest Airmotive Co.
DISTRICT OF COLUMBIA
Airwork Corp.
FLORIDA
Miami
Airwork Corp.
GEORGIA
Atlanta
Aircraft Parts Co.
Airwork Corp.
ILLINOIS
Hinsdale
Midcontinent Airmotive
Northbrook
Mid-States Aviation Corp.
INDIANA
Muncie
Muncie Aviation Corp.
IOWA
Des Moines
Des Moines Flying Service
KANSAS
Kansas City
Southwest Airmotive Co.
KENTUCKY
Louisville
Louisville Flying Service
LOUISIANA
New Orleans
Trans Air Corp.
Shreveport
Trans Air Corp.
MASSACHUSETTS
Boston
Airwork Corp.
MICHIGAN
Detroit
General Aircraft Supply
MINNESOTA
Minneapolis
Minnesota Airmotive, Inc.
Rochester
Gopher Aviation, Inc.
MISSOURI
Kansas City
Executive Aircraft Co.
St. Louis
Navco, Inc.
General Aviation Supply Co.
Southwest Airmotive Co.
NEW JERSEY
Newark
Airwork Corp.
NEW YORK
New York
Airwork Corp.
NORTH CAROLINA
Winston-Salem
Piedmont Aviation, Inc.
OHIO
Cleveland
General Aircraft Supply
Airwork Corp.
Vandalia
General Aviation Supply Co.
OKLAHOMA
Oklahoma City
General Aviation Supply Co.
Tulsa
Southwest Airmotive Co.
PENNSYLVANIA
Philadelphia
General Aircraft Supply
TENNESSEE
Memphis
Don Horn Co.
Trans Air Corp.
Nashville
Capitol Air Supply
TEXAS
Dallas
General Aviation Supply Co.
Southwest Airmotive Co.
Houston
General Aviation Supply Co.
Southwest Airmotive Co.
WASHINGTON
Seattle
Pacific Airmotive Corp.
WISCONSIN
Madison
Van's Air Service, Inc.

B.F.Goodrich **aviation products**

Step up to the finest . . .

Place your luggage in the large, knee-high baggage compartment, take one easy step into the luxurious cabin upholstered in rich fabric and genuine leather. For greater comfort, speed, payload and range, step up to the finest.

Write today for your copy of an illustrated brochure that fully describes the new Aero Commanders 500A, 500B, 560F and 680F.

AERO **COMMANDER** *offers the best combination of features essential to business flying*

AERO COMMANDER, INC., BETHANY, OKLAHOMA, subsidiary of ROCKWELL-STANDARD CORPORATION

Four side windows distinguish the new Cessna Skyknight, first light twin with turbochargers for performance advantages with sea level horsepower all the way up to 16,000 ft. Take-off from strips at altitude, 75% power for climb and cruise up to 19,500 ft., and 17,200-ft. single-engine service ceiling give it valuable advantages. —(Cessna Photo.)

Cessna Skyknight—First Turbocharged Twin

ITS turbo-superchargers — first on any light twin — furnishing sea level power up to 16,000 ft. for altitude performance, the new Cessna Model 320 Skyknight began going to dealers last month while Cessna pilots conducted demonstrations around the country. Ours was with Tony Lansbarkis, Cessna twin-engine sales manager, on a trip from Dallas to Santa Fe, New Mexico, and return.

Off from Dallas at 1:17 p. m. and at full gross weight, we used a climb speed of 155 mph. indicated airspeed and averaged better than 700-feet-per-minute rate of climb up to a cruising altitude of 12,500 ft. Trimmed out there with 2,300 rpm. and 28 inches of manifold pressure and with outside air temperature of 50 degrees, the Skyknight indicated 176 mph. and trued 222 mph. This was with 65% of power. We landed at Santa Fe at 4:11 p. m., covering 610 miles in 2 hrs. 54 mins. for an average ground speed of 210 mph. It took 74 gals. of fuel to top the tanks, so that fuel consumption averaged just under 26 gals. per hour.

As impressive as this was, however, it does not tell the story of the Skyknight, whose claim to fame is not speed alone but turbo-supercharging, which means horsepower at altitude. Take the airport at Santa Fe, for example — its 6,000-ft. elevation above sea level is, in effect, a density altitude of 8,600 feet when the temperature is 82 degrees, as it was when we were there. Despite this handicap, however, the Skyknight's turbo-superchargers made sea level power available to us (2,600 rpm. and 35 ins. of manifold pressure) and the Skyknight, at gross weight, took off after a run of only 1,300 ft. (the runway lights are 197 feet apart and we were off after passing the 6th light and before reaching the 7th light.)

This runway is 8,300-ft. long but there was 7,000 ft. of it in front of us when we left the ground. This, the Skyknight told us, is the meaning of horsepower at altitude and, at places like Santa Fe, it is more important than speed alone. Moreover, the Skyknight was climbed out of Santa Fe at better than 1,700 feet per minute, which also testifies to the significance of horsepower at altitude. No twin of any make with sea level engines can come anywhere near matching Skyknight gross-weight performance at Santa Fe with the thermometer at 82 degrees.

After take-off at 1:25 p. m., four of us began using oxygen for a cruising level of 15,500 feet, where the Skyknight could show more of its capabilities. At that level, with 2,450 rpm., 28.5 inches of manifold pressure and outside air temperature of 40 degrees, 73% of power gave the Skyknight 175 mph. IAS for 232 mph. TAS. Clouds in the way caused us to go to 19,500 ft., where 2,450 rpm., 25 ins. and 23-deg. OAT gave us 166 IAS for a true air speed of 234 mph. on 63% of power. Then a still-higher cloud ridge forced us to climb to 22,000 ft. and here again the significance of turbo-supercharging was demonstrated. Service ceiling for the Skyknight is 27,200 ft. but 75% power is available all the way up to 19,500 ft. We stood the Skyknight on its tail at 19,500 ft. to cross the cloud tops.

Staying there only momentarily, the 19,500-ft. level was resumed and the check-points were rolling past at a ground speed of 253 mph., revealing about 20 mph. worth of help from a quartering tailwind. Although we did more climbing, it meant less cloud detouring than on the trip West, so that our return trip East was slightly shorter at 585 miles, which was covered by the Skyknight in 2 hrs. and 23 mins. for an average ground speed of 242 mph. It took 62 gals. to top the tanks so that fuel consumption averaged 25.5 gals. per hour — the same as for the trip outbound.

A simulated single-engine demonstration at Santa Fe, using an incorrect zero — thrust setting to simulate feathering, was of no value, so Tony Lansbarkis set it up again, this time actually feathering the right engine at an altitude of 6,500 ft. and with an airspeed of 120 mph. in a climb. After feathering, with the climb speed settled down to 110 IAS and with the left engine using full throttle of 2,600 rpm. and 35 ins., the Skyknight was

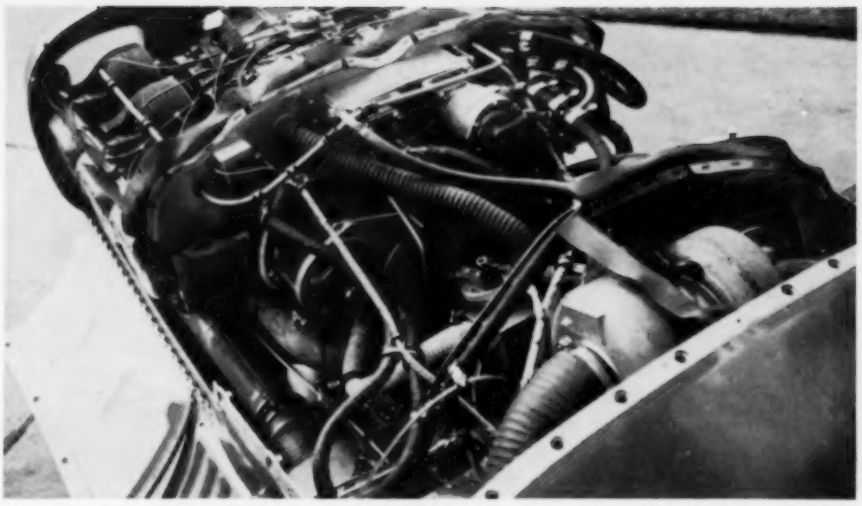
climbed from 7,000 to 8,000 ft. in 3 mins. 30 seconds, this giving an engine-out rate of climb of 285 ft. per min. at that altitude. Gross weight was at 4,830 lbs., which was about 160 lbs. under maximum gross. Trimmed for cruise at 8,000 ft., with 2,450 rpm., 29 ins. and 61-deg. OAT for 75% of power, the Skyknight with right engine feathered indicated 135 for a 158-mph. true airspeed on one engine. Single-engine service ceiling of 17,300 ft. exceeds that of any piston twin flying today. Factory performance is tabulated on page 30.

More than anything else, Skyknight performance advantages mean safety. Turbochargers will earn customer preference just as fast as customers operate them up at the altitudes where horsepower really counts for more than speed alone. The safety factors are too obvious and too numerous to ignore.

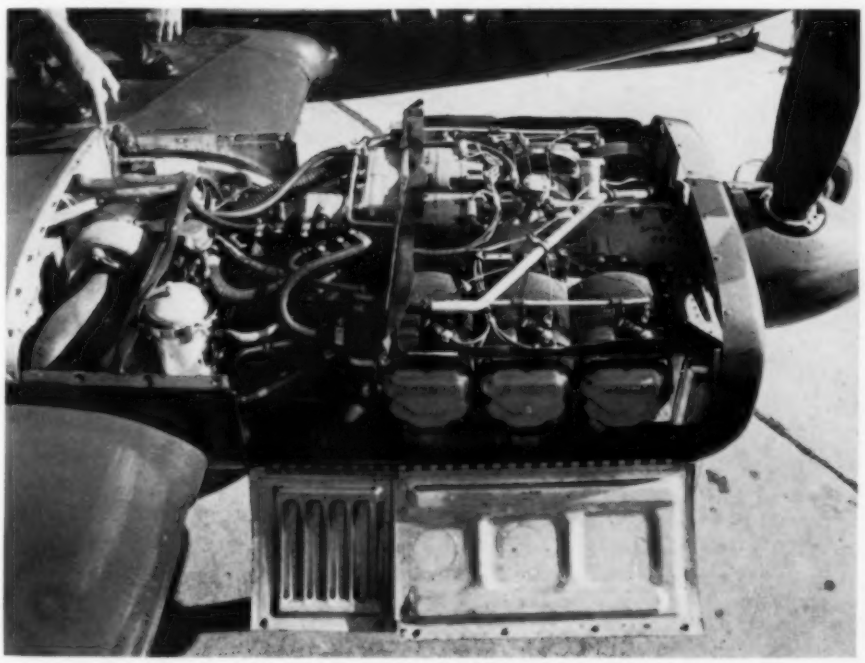
Perfected on diesels in tractors and earth-movers, the AiResearch T-1106 turbochargers on the Skyknight are relatively small, with a turbine wheel diameter of 3.5 ins. and a compressor wheel diameter of 3⅞ ins. The exhaust-driven turbine turns 20,000 rpm. for sea level take-off and at 60,000 rpm. with full throttle at 16,000 ft.

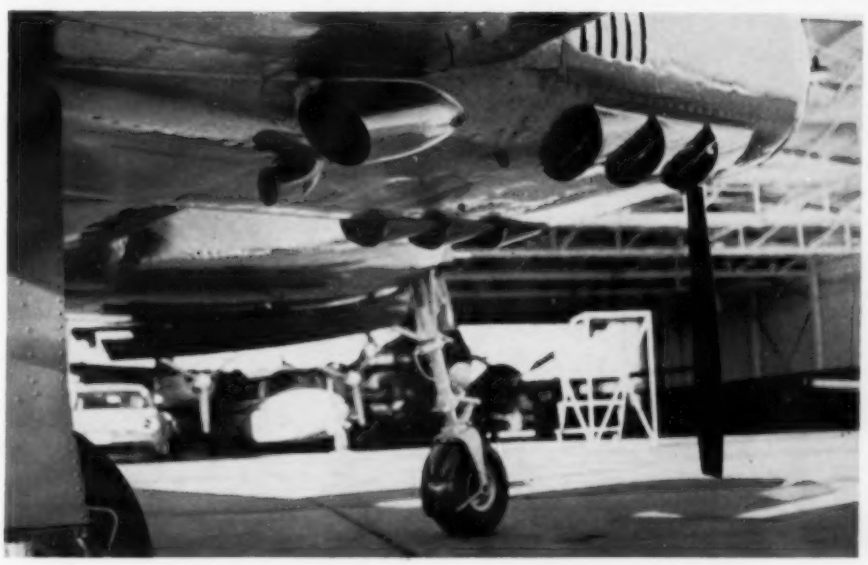
The Skyknight represents only the beginning of turbocharging for small engines and future developments, with more horsepower needed as performance standards are raised, possibly will bring larger turbines for higher manifold pressures.

Automatic control limits the blowers on the Skyknight to 35 inches of manifold pressure, which can not be exceeded. This control consists of a sensing unit connected to supercharger discharge pressure and a hydraulic servo actuator utilizing engine oil pressure for energy. Used servo oil re-enters the engine oil sump through a connecting hose. This arrangement controls supercharger discharge pressure to approximately 36 ins. which gives a manifold pressure of 35 ins. at full-throttle 2,600 rpm. As the aircraft climbs to altitude, more work must be done by the compressor to squeeze the thinner air for sufficient density to maintain the desired manifold pressure. To accomplish this, more of the exhaust gases are diverted to the turbine by closing a waste gate. When the throttle is open and the waste gate is closed, this is the critical altitude for the selected manifold pressure. In the Cessna installation, the turbo is so matched to the engine that turbo overspeed is not a problem and manifold air temperature does not become excessive.



These FLIGHT MAGAZINE photos show Skyknight turbocharger installation. Note tubes carrying supercharger pressure to fuel injection nozzles. Exhaust system incorporates metal bellows expansion joints (top photo). Picture below shows full-flow oil filter. Bottom picture shows two underwing outlets containing exhaust pipes — small one is from waste gate. Three cowl flaps are shown on each side of nacelle.





Skyknight's top fuselage line is 3.5 inches higher than that of the Cessna 310, raising the tail by that much. Note recontoured nacelle afterbody (above). Picture below shows new air intakes in wing leading edge on each side of the nacelles.

While the turbocharger is mounted independently of the engine, its use has required quite a few engine changes. The TSIO-470-B with the blower and the sea-level IO-470-D may appear identical on the outside but many of their parts can not be interchanged. The TSIO engine has (1) special exhaust system, (2) automatic manifold pressure control, (3) new crankcase with improved internal breathing and oil jets for piston cooling, (4) new pistons for a lower compression ratio of 7.5 to 1 (it is 8.6 to 1 for the IO-470-D), (5) a stronger crankshaft has a 1-in. longer extension of the prop flange, (6) new connecting rods, (7) improved crankshaft thrust bearings, (8) new piston-ring set-up, (9) new exhaust valves for higher temperatures and back pressures, (10) new intake manifold, (11) smaller air throttle, (12) injector nozzle air bleeds are manifolded together and connected to supercharger pressure, which is also supplied to the fuel pump relief valve and metered fuel pressure gauge, (13) new injector nozzles have larger orifices, (14) new oil pump has scavenge section for turbocharger lubrication, (15) full-flow oil filter is used, and (16) mag timing is retarded.

An outgrowth of the 310 twin, the Model 320 incorporates numerous airframe changes: (1) Cabin ceiling from second seat aft and empennage have been raised 3.5 inches and this raises the tail by the same amount; (2) cabin has 4 side windows; (3) baggage shelf has been lowered; (4) the 5th seat has been raised and moved aft and toward center for more leg room; (5) the two individual center seats have been raised; (6) horizontal stabilizer and elevator have been raised 3.5 inches, incidence changed from minus 3 degs. to zero so that elevator horn trails in cruise and 10-lb. downspring changed to 7-lb. spring; (7) wing leading edge has supercharger air intake inboard of each nacelle and cooling air intake for supercharger outboard of each nacelle; (8) nacelles have underwing exhaust and cowl flaps along bottom; (9) top of nacelle afterbody is covered; (10) engine support changed for dynafocal mounts to allow more room; and (11) engine compartment extended rearward to provide space for supercharger units.

Channeling exhaust through the turbochargers has a muffling effect and gives the Skyknight a different exterior sound — without the 310's augmentors, there's no "bark" in the exhaust. Underwing exhaust outlets make for a quieter cabin.

In addition, the Skyknight's standard equipment includes basic oxygen system installation, taxi light, ground electrical receptacle, two anti-collision beacons and "B" seating and headrests.

—T.A.

Cessna Skyknight

Factory Data

Price			$67,500
Horsepower			520 up to 16,000 ft.
No. Seats			5
Gross Weight, lbs.			4,990
Empty Wt., lbs.			3,190
Useful Load, lbs.			1,800
Useful Pct. of Gr. Wt., %			36
Std. Fuel Cap., gals.			102
Optional Fuel Cap., gals.			133
Oil Cap., gals.			6
Top Spd., mph.-alt.			265-16,000
Cruising Speed —	**Mph.**	**Pct. Hp.**	**Ft.**
	245	75	19,500
	223	75	10,000
Cruising Range, 133 gals., no res. —	**Miles**	**Mph.**	**Hrs.**	**Ft.**
	1,110	242	4.6	19,500
	1,430	207	6.9	25,000
	1,025	221	4.6	10,000
	1,320	171	7.7	10,000
Rate of Climb, fpm.				1,850
SE Rate of Climb, fpm.				400
Service Ceiling, ft.				27,200
SE Service Ceiling, ft.				17,300
Stall Spd., flaps and gear down, mph.				76
Stall Spd., clean, mph.				86
Min. SE Control Spd., mph.				88
Min. SE Safe Climb Spd., mph.				95
Best SE				
Angle of Climb Spd., mph.				105
Rate of Climb Spd., mph.				119
Take-off, ft. —				
Ground Run				870
Total Dist. Over 50-ft. Obst.				1,470
Landing, ft. —				
Ground Roll				640
Total Dist. Over 50-ft. Obst.				1,770
Wing Loading, lbs. sq. ft.				28.5
Power Loading, lbs. hp.				9.6

NOTE: Performance is for gross weight at sea level unless noted.

Program For 14th Annual NBAA Convention

BUSINESS aviation's outstanding event will be the 14th Annual National Business Aircraft Association Convention in Tulsa, Sept. 26-28, featuring professional pilot seminars and briefings and displays of newest aircraft and equipment. Here's the program:

Tuesday, September 26

8 a.m.-6 p.m.—Registration, 9 a.m.-6 p.m.—Exhibits open, featuring over 100 exhibit booths displaying latest in aircraft, parts, accessories, radios, instruments, services for the business aircraft fleet.

10:30 a.m.-12 noon—Annual NBAA membership business meeting, Pompeian Court, Mayo Hotel, including: Treasurer's Report by E. M. Beattie; President's Report by B. J. Bergesen; election, discussion of policies and programs and report on NBAA Pilot Disability Insurance program.

1-5 p.m.—Ladies Tour of Tulsa.

1-3:30 p.m.—Forum, Pompeian Court, Mayo Hotel: THE $250,000-$500,000 TURBINE-POWERED BUSINESS AIRCRAFT—What's in the Near Future? Manufacturers will brief latest developments, featuring U. S. and foreign aircraft and including performance characteristics, fuel-range-speed projections, standard nav-com equipment, availability dates, etc. Visual aids included in providing a look ahead for aircraft owners, pilots, servicing groups contemplating entry into this category of turbine-powered aircraft. Manufacturers invited to participate include Aero Commander, Beech, Douglas, Lear and Potez of France.

3:45-4:30 p.m.—Forum, Pompeian Court, Mayo Hotel: NEW CONCEPTS IN AIR TRAFFIC AND APPROACH CONTROL. Speaker, Sam P. Saint, American Airlines Director of Air Traffic Control Procedures. This outstanding authority, competent critic and advisor to both industry and government, will present well-illustrated and timely views on air traffic control problems and how they may be improved.

6-7 p.m.—First Niter Social Hour, Ivory and Emerald Rooms, Mayo Hotel.

7:30 p.m.—First Niter Banquet, Crystal Ballroom, Mayo Hotel. B. J. Bergesen, NBAA president, presiding. Announcement of NBAA president for 1961 and presentation of Miss Business Aviation. Speaker: FAA Administrator Najeeb E. Halaby.

Wednesday, September 27

8 a.m.-6 p.m. Registration continues. 9 a.m.-6 p.m.—Exhibits open.

9:30-10:30 a.m.—Forum, Pompeian Court, Mayo Hotel: THE FAA-AIR FORCE ALTITUDE INDOCTRINATION COURSE FOR BUSINESS PILOTS. Speaker: Capt. George E. Pendergrass, USAF and FAA Aviation Medical Service. A short but complete altitude indoctrination course, given at 50 AF centers throughout the U. S., is now available to all civilian pilots. The speaker has been instrumental in implementing this program and will give highlights of the course, which includes pressure chamber indoctrination. The course is aimed to give both pilot and passenger the altitude story in layman's language and avoids professional aero-medical jargon.

10:30-10:45 a.m.—Coffee break.

10:45-12 noon—Forum, Pompeian Court, Mayo Hotel: PROCEDURES AND EQUIPMENT FOR AIR TRAFFIC CONTROL. Speakers: Major Louis C. Sadek, USAF-FAA Criteria Section Chief, and Robert I. Gale, FAA Regulation and Procedures Chief. New holding pattern procedures, implementation of standard instrument departures and the uses and procedures for DME—all in the process of being placed into use in the air traffic control system—will be outlined and discussed by FAA personnel responsible for their concept, plans for regulation and development of procedures.

12:30-1:45 p.m.—Annual NBAA Safety Awards Luncheon, Crystal Ballroom, Mayo Hotel, with C. F. Zimmerman, NBAA Safety Awards chairman, presiding. Speaker: Senator A. S. Mike Monroney.

2-4:30 p.m.—Ladies Tour to Will Rogers Memorial.

2-4 p.m.—Forum, Pompeian Court, Mayo Hotel: PRACTICAL AERODYNAMICS FOR BUSINESS PILOTS. Speaker: James Neilsen, University of Southern California Aviation and Missile Safety Division. A discussion in practical terms showing how pilots can apply in daily operation aerodynamic laws governing single-engine or 4-engine aircraft.

6-7 p.m.—Annual NBAA Hospitality Hours, Ivory and Emerald Rooms, Mayo Hotel.

7:30 p.m.—Annual NBAA Awards and Honors Banquet Night, Crystal Ballroom, Mayo Hotel, with B. J. Bergesen presiding, and featuring NBAA safety awards to member companies and NBAA's special award to W. T. Piper, Sr., the manufacturer, for meritorious service to aviation. Speaker: Fred M. Glass, chairman, FAA Project Horizon Task Force on National Aviation Goals.

Thursday, September 28

9 a.m.-6 p.m.—Registration continues and exhibits open.

9:30-11 a.m.—Forum, Pompeian Court, Mayo Hotel: FLIGHT PROFICIENCY TRAINING MANEUVERS. Speakers: T. F. Walsh, FAA Airmen Training and Standards Section, and E. D. Jacobson, FAA Business and Industrial Section. Based on recent industry-FAA review, a thorough evaluation of flight proficiency training maneuvers is being given by FAA. Of value to all pilots, check pilots and instructors, discussion will cover how closely training and proficiency maneuvers should relate to ATR flight exam and to type rating flight test, and values found in "canyon approaches" and similar training and proficiency maneuvers.

11 a.m.-1 p.m.—Busses leave for Tulsa Municipal Airport.

12 noon-2 p.m.—Buffet Luncheon, executive flight hangar, Tulsa Municipal Airport.

2-4:30 p.m.—American Business on the Wing, Tulsa Municipal Airport executive flight hangar and flight line. Static and in-flight demonstration of America's business aircraft fleet, ranging from single- and multi-engine through turboprop and jet transports. Helicopters at work. New transport conversions. New interior arrangements. All for your inspection and observation. Firms invited to participate include: Aero Commander, Aerojet-General, Allison, Frederick B. Ayer & Associates, Atlantic Aviation, Beech, Bell, Boeing, Callair, Canadair, Cessna, Champion, Chance Vought, Colonial Aircraft, Convair, Doman Helicopters, Downer Aircraft, Fairchild, Forney Aircraft, Grumman, Helio, Hiller, Howard, Hughes, Kellett, Lockheed, Mooney, Navion, North American, Oakland Airmotive, On Mark, PacAero, Piper, Republic, Sikorsky, L. B. Smith, Trecker, W. C. Wold, Umbaugh and Volitan.

4:30-5:15 p.m.—Busses return to Mayo Hotel.

6:30-7:15 p.m.—Busses leave for Ranch Party, executive flight hangar, Tulsa Municipal Airport.

7 p.m.-1 a.m.—Ranch Party, chuck-wagon dinner, cowboy and Indian entertainment, dance.

The Author (right) discusses fine points of his new Jet Commander with Harry Fante, president of Aero Commander, and John Brown (center), Commander distributor.

The Jet Commander And Its Legacy

Pioneers of the light twin, Ted Smith's team starts new era with business jet

By TED R. SMITH
Vice President, Engineering Division
Aero Commander, Inc.

SOME years ago (seventeen, to be more exact) a dream was in the minds of a small group of us to create an aircraft specifically designed as a transporation tool for business, to permit businessmen to fly in their own equipment in safety, in comfort, and in speed to the same degree or better than was found in the then-known scheduled airline equipment.

This aircraft for businessmen would provide all of the refinements in aerodynamics, in structures and in performance that the state of the art would permit. In reality, it was ahead of certain necessary modern developments in propellers and engines. Although the larger transports had such things as supercharged engines, constant-speed, full-feathering propellers, accessories designed for the larger engines, and instruments designed for a particular purpose — none of these was available for the dreamed-of business aircraft. It was hoped these and others would be developed once the aircraft was proven successful with the power plants and propellers that were available.

The entire project was a venture in dreams, in hopes, in faith and courage and in our full belief that here was pioneering; here was a hope for reality; and here, too, a challenge in the American free-enterprise system. Here were people who believed in their ideas, in their convictions, in their ambitions, in their professional abilities. Here were people who wanted opportunity and were driven by a strong desire to succeed. So strong were our beliefs that we worked long and hard after regular hours and spent our own hard-earned savings to engineer and build a prototype of the aircraft envisioned by our dream.

Then, on an April day in 1948, a beautiful twin-engine aircraft stood poised on the threshold of a runway in Culver City, California, ready to try its wings, ready to either gladden or dishearten the minds and hearts of this group of pioneers — a group then known as Aero Design & Engineering Corp.

The afternoon had been cloudy and rainy, and with a take-off time previously set for 4:30 p.m. it did not look as though the initial flight would be made. Then, suddenly, as if God had seen and had heard, the skies began to clear and at exactly 4:35 the sun shown through some breaks in the clouds and at 4:37 the first Aero Commander was airborne. For seventeen minutes, Johnnie Martin and I tried the wings of this new bird, a dream come true. Successful? Yes, every parameter that had projected this machine on the drawing board and through the many engineering reports and calculations was fulfilled. A new concept in an aircraft specifically designed for this new dreamed-of purpose had gladdened the hearts and minds of those responsible.

In the months and years that were to follow, however, there were many discouragements. There was a lack of funds to proceed further into CAA certification and production. The highways and the airways across the continent were trod many, many times searching, hoping for assistance. Then one day assistance came. It came in step one, to finance certification and in step 2, to set up a production facility in Oklahoma City, and in August of 1950, Aero Design was on its way — on its way to build this new and specially engineered craft as a tool for industry throughout the world. In August of 1951, the first production Aero Commander was flown. On January 31, 1952, the production Aero Commander was CAA certified — just seventeen months from an empty hangar to a production-line, certified aircraft.

Following this, Aero Design started the climb up the very high ladder of success in a field of air transportation we were pioneering. We were building an aircraft whose capabilities had been

proven in the areas of performance, safety, versatility and comfort. Its characteristics were so forgiving for a twin-engine aircraft that pilots with limited experience could fly it — and fly safely. But this was not the end; it was only the beginning, for over the years it took many thousands of hours, many days, many months, and years in working with others (the engine companies, the propeller companies, the accessory manufacturers) to develop these products so the basic concept of the aircraft could progress, become more versatile, increase its performance, its capability and its safety.

Today we have geared and supercharged engines; we have constant-speed, full-feathering three-blade propellers and we have accessories designed for a purpose — because of the dream and perseverance of a few people to provide a new design concept in an aircraft for business.

To date, over 1,100 Aero Commanders have been delivered from the factory. In every country throughout the world these Aero Commanders are doing the job for which they were specifically designed — carrying people and products; saving time, adding convenience of schedules, working hard just as a machine tool in a factory works hard to produce parts. Today there are many designs in aircraft to fit the need of business — single-engine as well as twin-engine, the end result again of a dream, faith, and courage in the minds of a few.

Today, too, Aero Commander is entering a new era — again first — in an aircraft category of size, capability, versatility, safety and performance. Today, with the Aero Commander Model 1121 executive jet transport, we find the same people who many years ago set their hearts and minds tenaciously to a purpose. Today we are starting the cycle all over again to enter a new, more exciting, more challenging, and more competitive era than ever before — still motivated by faith, hope, belief and courage; still working with private capital without government contract or subsidy; still believing that there lies ahead a greater world of business aviation, and to satisfy this belief: The Jet Commander Model 1121.

This aircraft, like the pioneering Commander, was designed for a purpose; an aircraft that can carry six people and baggage at a speed in excess of 500 mph. across the continent with one stop; an aircraft that can take off and land at any airport in the world whose runway length is 3,000 feet or over from sea level up to 5,000 ft. elevation and with a temperature accountability of 100° F. at sea level and 82° F. at 5,000 feet above sea level. An aircraft whose characteristics are as good as or better than those of the past family of Aero Commanders; an aircraft that affords maximum comfort for pilot and passengers; an aircraft than can universally carry people or cargo for business at a cost per mile comparable to a scheduled airliner; an aircraft tailored for business, to buy time for businesses so that more time might be devoted to business matters and to the competitive aspects of business.

The Aero Commander 1121 design is based on the state of the art in aerodynamics, in structures, and in systems that exist today. It is backed by Aero Commander's many years of experience in the specialization of designing and building aircraft for business — the experience that has been responsible for the success of current models. The Model 1121 will be certified to the highest standards that Aero can justify and these standards are, in most instances, higher than the FAA Part 4b category, against which document the aircraft will be certified.

Throughout the structural portions that are subjected to pressure loads due to cabin pressurization, as well as those components such as wing and empennage that are subjected to flight loads, a fail-safe structural philosophy is used. Simply, this means that should a failure occur in any structural member for any reason, the assembly will continue to carry the loads imposed on it through limit load or beyond without detrimental effects or catastrophic failure.

Systems are designed to account for

Full-scale Jet Commander mock-up was inspected last month by Aero Commander distributors, who also saw prototype being built — first flight is expected within 9 months. —(Aero Commander Photo.)

General Electric CJ610 jet engine mock-up for the Jet Commander.

perfection of operation in all altitude regimes and at temperatures ranging from -65° F. to +165° F.

Control systems are kept simple, mechanical throughout, with no elaborate or complex boost systems to give in-flight problems or maintenance problems.

All control surfaces are 100% mass balanced by element so as to provide maximum stability in their dynamic characteristics. They are also properly balanced aerodynamically to obtain satisfactory levels of forces at the control units in the cockpit.

Oxygen systems provide independence for crew members and a completely automatic system for passengers.

Cabin pressure differential is 7.5 psi. with relief valve setting at 8.0 psi., giving an 8,000-foot cabin altitude when the aircraft is operating at 35,000-foot pressure altitude, or a sea level cabin altitude when the aircraft is operating at pressure altitudes up to 18,000 feet. The pressurization and air conditioning system has been kept simple yet positive, and as nearly foolproof as possible. Bleed air from the General Electric CJ610 engines, ducted through AiResearch system components and controller, furnishes the power for the pressurization system. Capacity is such that full pressurization may be obtained with single-engine operation.

All-weather systems can be installed — electrically energized boots for wing and empennage provide anti-icing for these surfaces. An electrically energized windshield provides anti-icing for large portions of this unit, and anti-icing for the engine inlet and fuel screens is standard. Standard also is anti-icing for airspeed pitot tubes and fuel tank vents.

The windshield on the Jet Commander is designed to meet all of the bird impact requirements at approach and take-off speeds.

Electronic gear can be installed to meet the most discriminating pilot's requirements, including an 18-inch radar. The latter can be installed without going outside the design contours.

Flight ability and characteristics of the Model 1121 are such that a transition can be made quite easily by any pilot with reasonable twin-engine experience. The airplane was designed this way — no long transition periods like the airlines found necessary — no swept wing to get into serious dutch roll and stability problems — no marginal flight load factors to get into structural problems during high speed flight — no special control problems due to power boost systems or flying stabilizers — just straight-forward, simple concepts that all pilots know and are used to. There will be no special runway lengths to worry about, for here is a jet aircraft with a unique balance between power loading and wing loading so that at full gross weight the aircraft can operate from 3,000-foot runways from sea level up to 5,000-ft. elevation and with accountability in temperature to standard hot day conditions at these altitudes.

For the pilot, too: A cockpit arrangement that is simple — more simple than the cockpit in an Aero Commander 680F-P, yet containing all of the adequacy necessary for safe operation of the aircraft. The Model 1121 is designed for one-pilot operation yet adaptable to two-pilot operation (the cockpit is closed off completely from the passengers).

Jet Commander
Design Data

Powered by two GE CJ610-1 jets, 2,850 lbs. of thrust each. Cabin pressure of 7.5 psi. provides sea level cabin up to 18,000 ft.; 8,000-ft. cabin at 35,000 ft.

Price	**$475,000**
No. Seats	**6**
Gross Wt., lbs.	**14,000**
Empty Weight, lbs.	**6,300**
Useful Load, lbs.	**7,700**
Useful Pct. of Gr. Wt., %	**55**
Fuel Cap., gals.	**950**
Stall Spd., landing, mph.	**95**
Stall Spd., clean, mph.	**111**
Design Cruise Speeds—	
Indicated Airspeed below 20,000 ft., mph.	**415**
Indicated Airspeed at 20,000 ft. and above, Mach	**0.80**
True Airspeed at 35,000 ft., mph.	**503**
Cruising range, miles	**1,930**
Gear Extension Spd., mph.	**287**
Flap Extension Spd., mph.	**172**
Rate of Climb, fpm.	**7,000**
SE Rate of Climb, fpm.	**2,200**
Service Ceiling, ft.	**44,000**
SE Svc. Ceiling, ft.	**28,000**
Take-off Dist. Over 50-ft. Obst., ft.	**2,129**
Span, ft.	**43.31**
Length, ft.	**48.00**
Height, ft.	**14.75**

For passengers: Maximum in comfort — large, airline-type chairs, tables, coat room, lavatory, built-in galley and bar, and a noise level that is only the airstream flowing over the fuselage and wing. There is a quietness never before dreamed of in an executive airplane. There is the same one-step ease of entrance to the cabin that has been so popular in predecessor Aero Commanders.

Then another great first — guaranteed delivery, guaranteed price and a guaranteed service for one year that is all inclusive.

This, in brief summary, is the Jet Aero Commander Model 1121 — a new aircraft, a new concept, a new era in the business aircraft field. Research yesterday has given us this progress today.

Exciting, fascinating, rewarding is this great, great world of business aircraft — a world all its own, always challenging the minds of men to do better, to make better and to make more business aircraft.

The jet era for the true business aircraft is here and its challenge is upon us. With undaunted hopes, faith and courage, Aero Commander is accepting this challenge in providing the Jet Commander Model 1121. In May of 1962, first flights of this new aircraft will take place and in the last quarter of 1963, certified production aircraft will be available.

Photos show Jet Commander prototype's cabin section under construction last month. Note 7.5-inch spacing and "tall-oval" shape of frame for pressurized cabin.

New Jet Commander Developments

SINCE Aero Commander announced its Jet Commander Model 1121 last May, the company has taken important steps to strengthen the position of its 500-mph., 6-place twin-jet, first on the market in its category. All of the new developments took place last month. They are as follows:

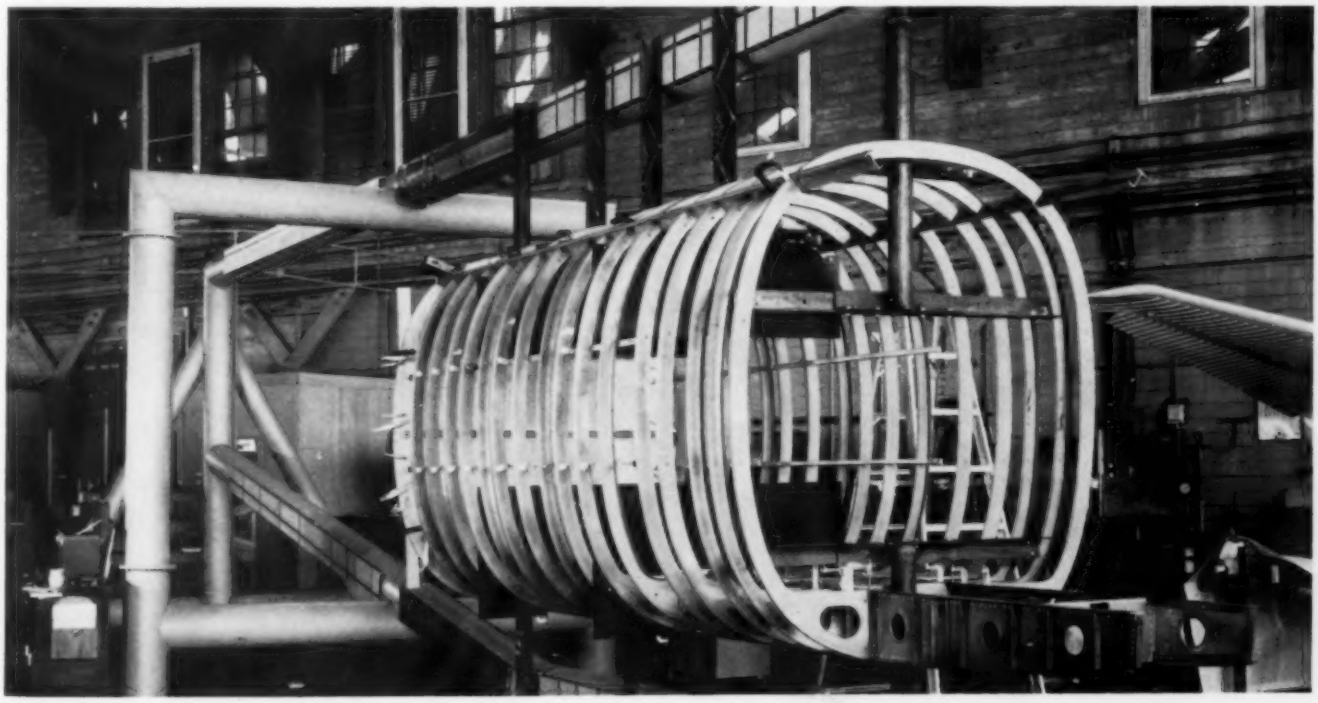
1. After conferences with FAA officials, the company announced it will certificate the new Jet Commander under Part 4b, the transport category of the Civil Air Regulations.

2. Construction of the prototype was proceeding rapidly and was ahead of a schedule which calls for its first flight in the Spring of 1962 with first deliveries in the 3rd quarter of 1963. The prototype may fly before next April. It is being built at the firm's research and development facility at Norman, Oklahoma, where production tooling is well under way. Parts are already being produced at the Bethany, Oklahoma, factory.

3. At a two-day seminar where Aero Commander distributors were briefed by engineering and General

(Continued on page 67)

This view shows how Jet Commander cabin section is fabricated in a large jig. Note how floor beams provide keel structure for entire length of cabin. Jet Commander is mid-wing design. —(Aero Commander Photos.)



Happy day for JetStar purchasers came on August 29 when FAA type certificate was personally presented by FAA Administrator Jeeb Halaby (left) to W. H. Pulver, president of Lockheed-Georgia.

JetStars Join Business Fleet

LONG-AWAITED deliveries of the 550-mph., 10-place, 4-engine Lockheed JetStar began immediately after FAA Administrator Najeeb E. Halaby personally presented its airworthiness certificate to Lockheed on August 29. The FAA certificated the JetStar in the 4b transport category, climaxing a 4-year project which began on September 4, 1957, when the prototype made its first flight only 14 weeks off the drawing boards.

Continental Can Company of New York in March, 1959, became the first corporation to order the JetStar. Other firms ordered the executive jet — Pratt & Whitney Aircraft, Krupp of West Germany, an Italian oil firm and others — before the first military order was received from the U. S. Air Force in June, 1960. As of last month, a total of 38 JetStars had been ordered, including 11 for the military.

Eight of the JetStars will be delivered to customers before the 14th Annual National Business Aircraft Association Convention gets under way in Tulsa this month. Eighteen will be delivered before the year's end. First ones are going to Continental Can, Superior Oil, Krupp, the Eaton Company, Ford Motor, the Canadian

Superior Oil's Bob King (left), pictured at factory where he took maintenance course, expects JetStar to cut corporate aircraft maintenance in half. He's specialized in aircraft maintenance for 35 years. Below is typical custom interior for JetStar — AiResearch Aviation Service's full-scale cabin mock-up on which customer interiors were perfected. Aisle headroom is 6 ft. 1 in.

Lockheed pushed FAA certification with five JetStars. Airframe dimensions are about the same as those of the Lodestar. Over-all dimensions are 60.5-ft. length, 53.8-ft. span and 20.6-ft. height over the tail. Aisle headroom in cabin is 6 ft. 1 in.

Department of Transport, the U. S. Air Force and others. Their crews have already received Lockheed training at the Lockheed-Georgia Company's factory at Marietta, Georgia, where the JetStar is produced. Horton & Horton of Ft. Worth, AiResearch Aviation Service at Los Angeles and other custom shops are installing cabin interiors, electronics and otherwise finishing the new jets to customer specifications.

Lockheed expects other corporations will begin ordering JetStars, now that certification has been completed and deliveries are being made. Lockheed's price is $1,365,000 for the fastest executive transport ever made available to business and industry. Built, equipped, certificated and operated to highest airline standards, it ushers in the jet era for business flying with phenomenal performance capabilities, as demonstrated by a recent transcontinental flight as part of the final certification program.

Grossing 39,295 lbs., which is close to its 40,690-lb. maximum gross take-off weight, the JetStar took off from Dobbins Air Force Base, Georgia, after a run of only 3,800 ft. It climbed to cruise altitude of 36,000 ft. in 23 minutes, at which it was still climbing at a rate of 500 fpm. After 4 hrs. 23 mins., it was landed at Palmdale, California, averaging 400 mph. for the 1,761-mile trip. Fuel consumption totalled about 2,100 gals., and the JetStar landed at 24,295 lbs. gross weight, using only 2,800 feet of runway for the landing. JetStars have consistently made nonstop trips in the opposite direction, from California to Georgia, in less than 3.5 hrs.

In the final stages of the certification program, one of the 5 JetStars used for that purpose logged 173 flight hours in less than 30 days, operating at many cities.

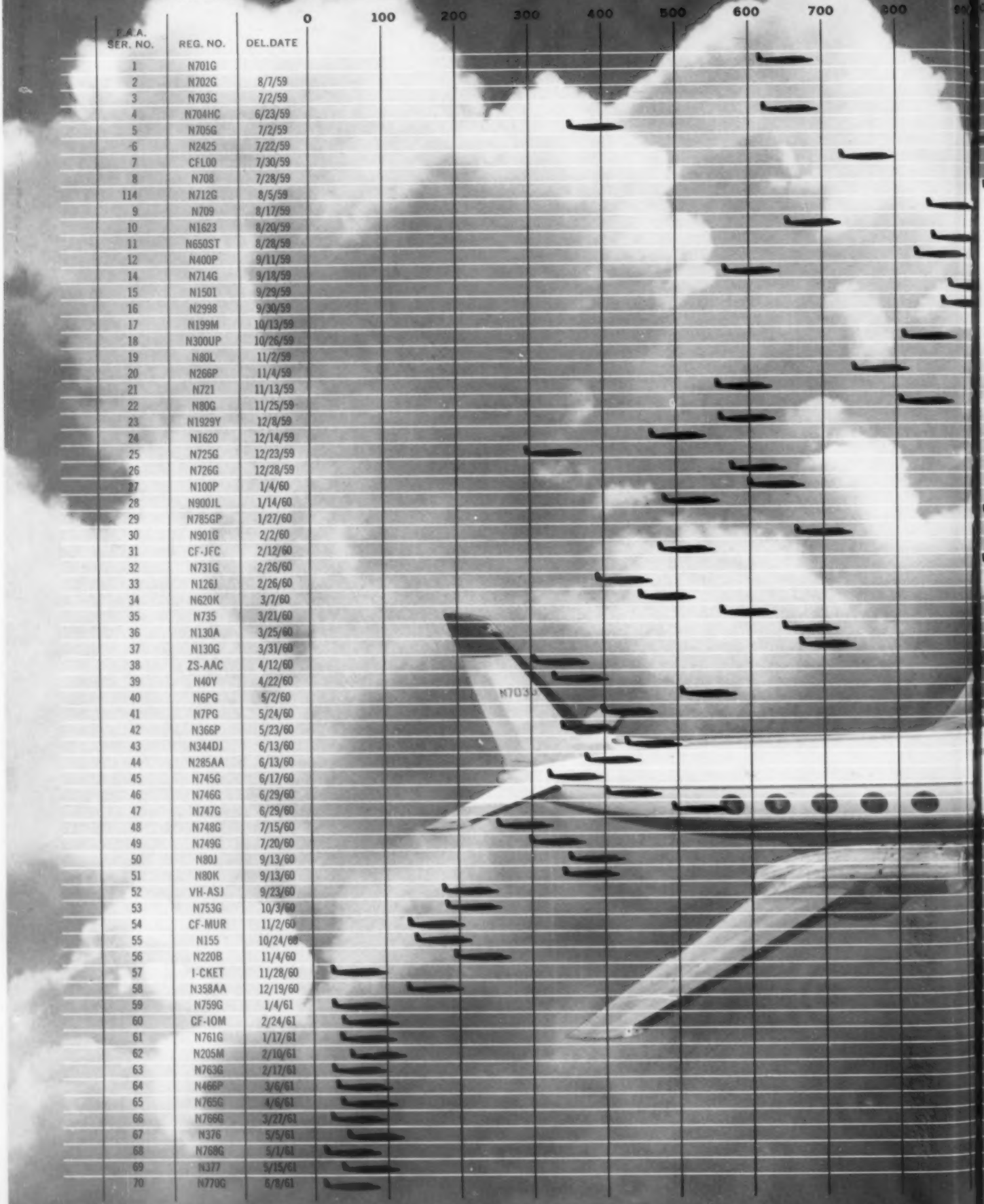
Its four Pratt & Whitney JT-12 turbo-jets, each rated at 3,000 lbs. of static thrust at sea level, are equipped with thrust reversers which shorten landing runs without the use of wheel brakes. Pressurization provides a sea level cabin up to 23,000 ft. and an 8,000-ft. cabin at 45,000 ft.

Latest Lockheed JetStar "numbers" include: Maximum take-off weight, 40,921 lbs.; zero fuel weight, 22,450 lbs.; empty weight, less fuel and payload, 20,030 lbs.; maximum landing weight, 30,000 lbs.; payload capacity, 2,420 lbs.; fuel capacity, 2,630 gals.; cruise speed, over 550 mph.; stall speed, 114 mph.; rate of climb, 3,400 fpm.; maximum cruise altitude, 43,000 ft.; range, 2,500 miles, and field length, less than 5,000 ft.

For customer service, Lockheed's Field Service Department is appointing fixed-base operators throughout the U. S., Canada and Europe. Technicians at these service centers will be trained by Lockheed.

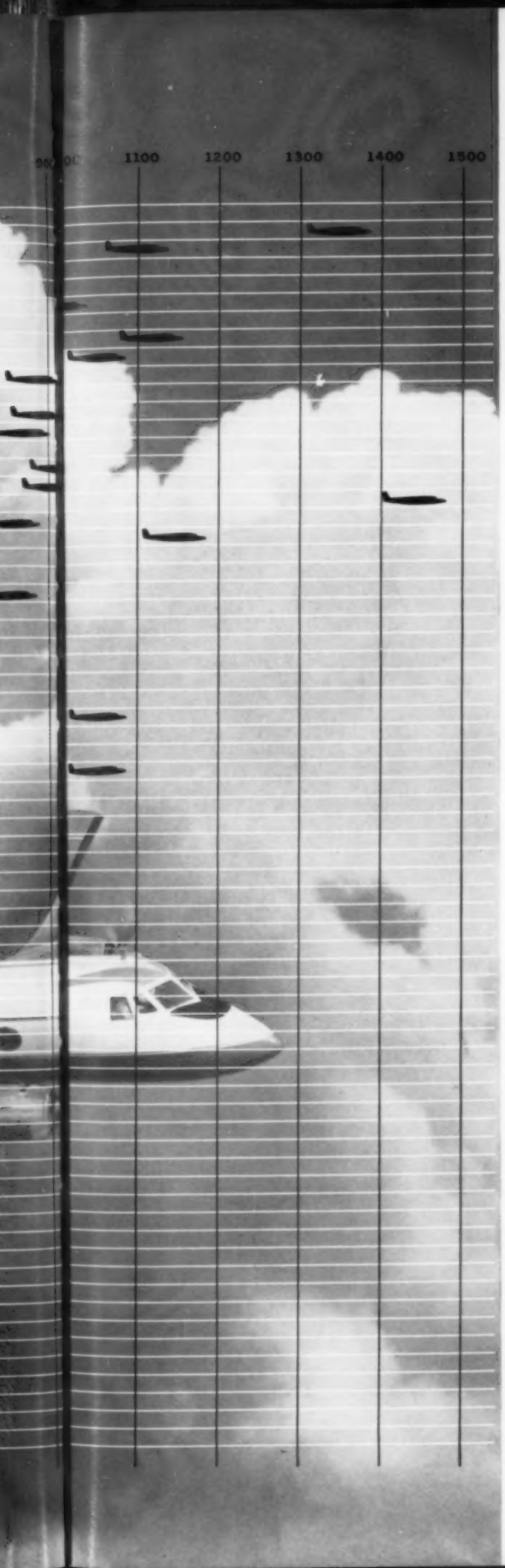
One of test JetStars is shown below being refueled at Albuquerque's Kirtland Field during functional and reliability tests. Fuel capacity is 2,630 gals. for 2,500-mile range in 5 hrs. —(Lockheed Photos.)

FLYING HOURS SINCE F.A.A. CERTIFICATION.



F.A.A. SER. NO.	REG. NO.	DEL. DATE
1	N701G	
2	N702G	8/7/59
3	N703G	7/2/59
4	N704HC	6/23/59
5	N705G	7/2/59
6	N2425	7/22/59
7	CFLOO	7/30/59
8	N708	7/28/59
114	N712G	8/5/59
9	N709	8/17/59
10	N1623	8/20/59
11	N650ST	8/28/59
12	N400P	9/11/59
14	N714G	9/18/59
15	N1501	9/29/59
16	N2998	9/30/59
17	N199M	10/13/59
18	N300UP	10/26/59
19	N80L	11/2/59
20	N266P	11/4/59
21	N721	11/13/59
22	N80G	11/25/59
23	N1929Y	12/8/59
24	N1620	12/14/59
25	N725G	12/23/59
26	N726G	12/28/59
27	N100P	1/4/60
28	N900JL	1/14/60
29	N785GP	1/27/60
30	N901G	2/2/60
31	CF-JFC	2/12/60
32	N731G	2/26/60
33	N126J	2/26/60
34	N620K	3/7/60
35	N735	3/21/60
36	N130A	3/25/60
37	N130G	3/31/60
38	ZS-AAC	4/12/60
39	N40Y	4/22/60
40	N6PG	5/2/60
41	N7PG	5/24/60
42	N366P	5/23/60
43	N344DJ	6/13/60
44	N285AA	6/13/60
45	N745G	6/17/60
46	N746G	6/29/60
47	N747G	6/29/60
48	N748G	7/15/60
49	N749G	7/20/60
50	N80J	9/13/60
51	N80K	9/13/60
52	VH-ASJ	9/23/60
53	N753G	10/3/60
54	CF-MUR	11/2/60
55	N155	10/24/60
56	N220B	11/4/60
57	I-CKET	11/28/60
58	N358AA	12/19/60
59	N759G	1/4/61
60	CF-IOM	2/24/61
61	N761G	1/17/61
62	N205M	2/10/61
63	N763G	2/17/61
64	N466P	3/6/61
65	N765G	4/6/61
66	N766G	3/27/61
67	N376	5/5/61
68	N768G	5/1/61
69	N377	5/15/61
70	N770G	5/8/61

Shown above: actual recorded flight time on Gulfstream aircraft—May 1959 to July 1961.



Grumman Gulfstreams set outstanding utilization records! Fly 68 million passenger miles since May 1959

One Gulfstream, owned by George W. Crothers Limited, traveled 171,000 passenger miles in just one week!

68 million passenger miles! 35,000 flying hours! *All* in just 26 months, from F.A.A. certification in May 1959 to July 1961....

This is aircraft utilization at its best . . . aircraft utilization that only a Gulfstream can deliver. For it is the only aircraft in its class designed exclusively as a business airplane!

The result: the Gulfstream offers unique flight and ground flexibility. It's the most do-everything business airplane there is—one of the most useful *and* usable business airplanes in the world!

For a good example of this, just consider the experience of George W. Crothers Limited of Toronto, Ont. This company's Gulfstream traveled 171,000 passenger miles in just seven days!

Starting on a Sunday and for seven consecutive days on a daily basis—the Crothers' Gulfstream ran scheduled trips between Toronto and Tampa, Florida. The purpose of these trips was to airlift top Canadian customers to Tampa for demonstrations of a new line of tractors handled by Crothers Limited.

The seven-day Crothers flight log tells the Gulfstream utilization story with dramatic detail.

	DEPARTED	ARRIVED	DEPARTED	ARRIVED
Sunday	Toronto 07:57 Ft. Lauderdale 14:20	Tampa 12:04 Toronto 18:25	Tampa 12:42	Ft. Lauderdale 13:35
Monday	Toronto 08:10	Tampa 11:28	Tampa 13:08	Toronto 17:06
Tuesday	Toronto 08:24	Tampa 11:45	Tampa 12:47	Toronto 16:44
Wednesday	Toronto 07:52	Tampa 11:29	Tampa 12:50	Toronto 16:34
Thursday	Toronto 07:57	Tampa 11:42	Tampa 12:53	Toronto 16:27
Friday	Toronto 07:59	Tampa 12:25	Tampa 13:26	Toronto 16:52
Saturday	Toronto 07:34	Tampa 11:05	Tampa 12:37	Toronto 16:27

Flight performance like this—performance that makes the Gulfstream ideal for 71-mile or 7100-mile trips—is one reason why 70 Gulfstreams are now in operation. Other reasons are Gulfstream's proven safety, reliability, comfort and beauty. It's a sound investment.

Corporate executives and pilots may arrange for demonstration flights through the following distributors. In the United States: Atlantic Aviation, Wilmington, Del.; Pacific Airmotive, Santa Monica, Cal.; Southwest Airmotive, Dallas, Tex. In Canada: Timmins Aviation, Montreal. In Europe: Atlantic Aviation Export Corporation, London, England.

GRUMMAN

AIRCRAFT ENGINEERING CORPORATION

Bethpage • Long Island • New York

Completeness of M-4 System is indicated by sophistication of its Controller. Five push-buttons establish modes for automatic navigation and approaches. Engage switches are for autopilot (top) and yaw dampening. Yaw dampener can be used with autopilot off.

M-4 uses Motorola artificial horizon to obtain pitch and roll deviations. It is available for either 3⅛-in. or 3¾-in. panel cut-out.

New Motorola M-4 Automatic Flight Control System

A NEW transistorized Motorola M-4 Automatic Flight Control System will be introduced on the market this month, making its debut at the 14th Annual NBAA Convention at Tulsa. Deliveries will begin in October. It has already been certificated in Cessna, Beech and Aero Commander Twins and will next be certificated in Piper Twins and then in single-engine aircraft.

Described by Paul Momenteller, Motorola marketing manager, as a logical outgrowth of the widely-used L-2 autopilot, the M-4 represents a major advance in flight control design for general aviation and is the first flight control system supplied by a single manufacturer combining a 3-axis autopilot, an omni and ILS coupler and a course director function in one integrated package.

The M-4 provides (1) continuous automatic 3-axis stabilization plus (a) automatic pitch trim synchronization and (b) automatic yaw dampening and roll trim adjustment; (2) automatic VOR navigation and automatic ILS approaches; (3) course director function for manual navigation of VOR radials and localizer courses, and (4) command functions such as constant-rate turns, constant-rate climbs and descents, and automatic heading-hold and automatic altitude control. The first flight control system for general aviation aircraft to earn certification under the new airline-standard TSO regulation, it was certificated under FAA regulation C9C.

Transistorized for tubeless electronics and printed circuitry, its computer-amplifier is packaged in a short 3/8 ATR case incorporating 9 plug-in circuit boards, including a pre-set calibration module for each make and model of aircraft in which it will be installed. Installed weight is said to be approximately 50 lbs., not including the gyros, which replace existing units. The complete system will be priced at approximately $9,000.

The Flight Controller is backlighted and provides mode selection by means of 5 push-button switches which are self-illuminating with bright-dim control. These push-buttons are designated HDG (heading), Capture, Track, GS (glideslope) and ALT (altitude). All 5 can be employed in automatic operation. The HDG, Capture and Track modes only are available in manual course director operation. Incompatible modes, such as ALT and GS, can not be engaged simultaneously — the last-selected mode takes precedence and the incompatible mode is automatically disengaged. HDG, Capture or Track can be disengaged by momentarily moving the Turn knob. The GS mode is disengaged by momentary movement of either the Turn or the Pitch knobs. The Turn knob has no effect on the ALT mode, which must be disengaged by the Pitch knob.

All operating controls for the autopilot function are centralized on the Flight Controller — with the exception of (1) the OBS (omni bearing selector) knob located on the VOR-ILS Indicator, (2) the quick disconnect switch located on the aircraft control wheel, (2) the system master switch located on the aircraft switch panel, and (4) the NORM/REV switch mounted on the panel-mounted course director function switch.

The system's Master Switch arms (1) the autopilot engage switch, (2) the CD function switch and (3) the yaw dampener switch. In addition, it causes the pitch synchronization function to become operative so that the aircraft will attain and maintain a wings-level attitude at the pitch attitude existing at the time of engagement of the autopilot engage switch. Yaw dampener operation is automatically introduced by the autopilot engage switch.

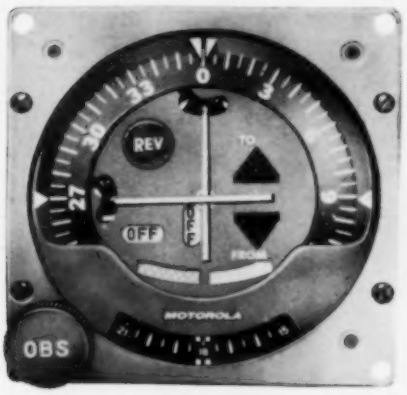
Manually initiated turns are executed with the Turn knob; the Pitch knob controls ascents and descents, and roll trim is introduced with the Roll Trim knob.

Stated in simple terms, here are some of the M-4's push-button capabilities:

Heading Selection — Set in desired heading with HDG knob. Press HDG

New Motorola directional gyro senses yaw deviation and provides heading references.

Motorola turn and bank furnishes yaw rate signals. Yaw dampening is an M-4 feature.



Motorola VOR/ILS Indicator has OBS (omni bearing selector) knob. Note warning light with "Rev" to remind pilot when needle is reversed for back course of ILS.

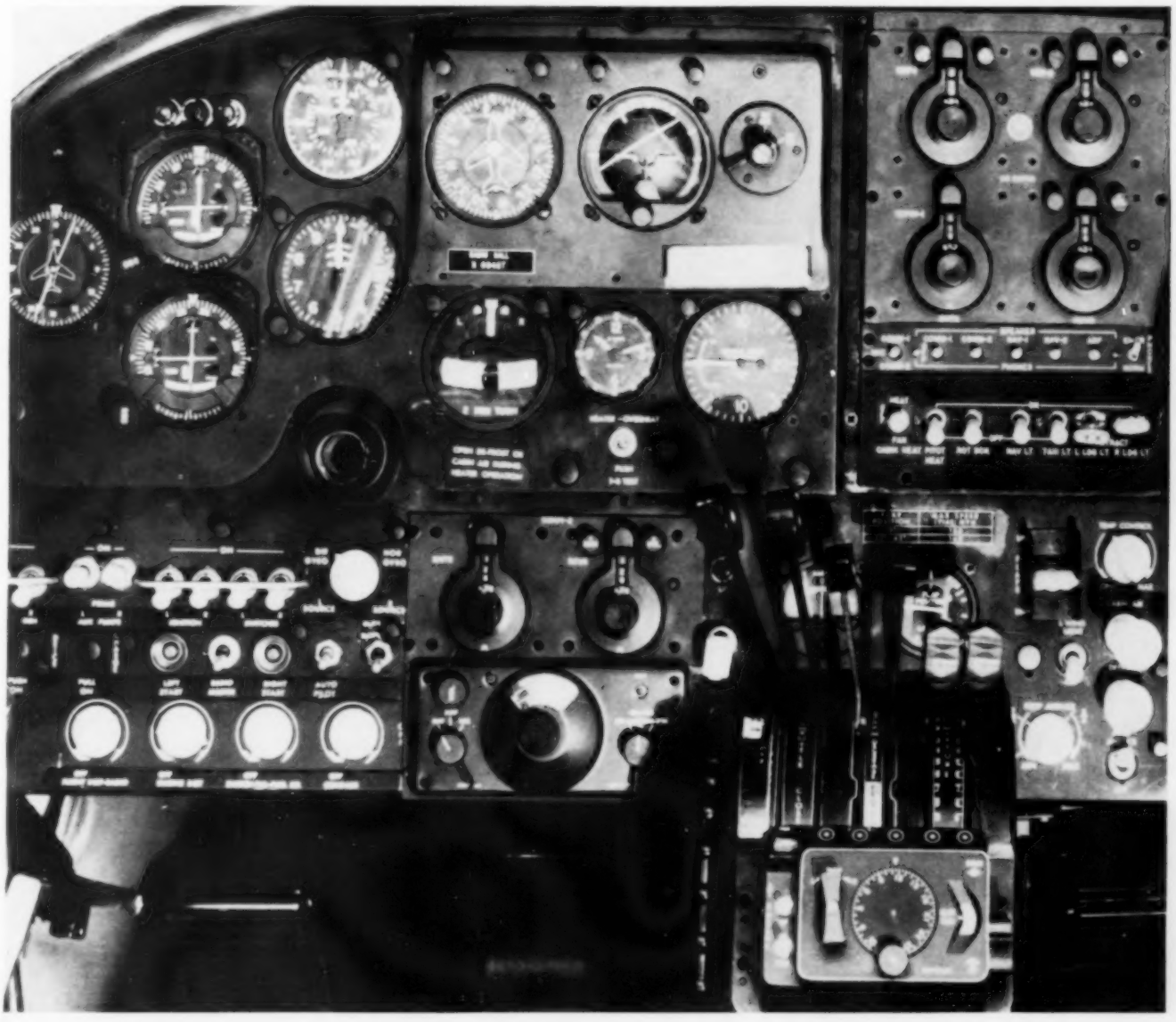
button. Aircraft will turn to and hold new heading.

VOR Navigation — Tune in omni station. Set in VOR course with OBS knob. Press Capture button when pointer leaves 4-dot position. Aircraft will turn to and intercept radial at 60-degree angle. When aircraft heading is within 15 degrees of the desired radial, press Track button. Aircraft will now align with center of the radial with no stand-off error.

ILS Approach — Tune in ILS equipment. Set inbound localizer course with OBS knob. Press Capture button when pointer is within 3 dots

(Continued on page 67)

Motorola M-4 installation is pictured in Cessna 310, with Controller on pedestal and CD switch next to artificial horizon



This new Mackey Airlines service center at Ft. Lauderdale caters especially to business flying with 24-hr. service for all types of aircraft. Leonard Povey is manager.

New Business Flying Center In Florida

A NEW service center for business flying has been opened on the north side of Broward County International Airport at Ft. Lauderdale by Mackey Airlines, which operates in Florida, to Nassau, the Bahamas and Cuba.

Operating 24 hours daily, complete facilities for general aviation include aircraft owners lounge, pilots lounge, conference room, briefing room with weather teletype and direct lines to FAA flight service, swimming pool, airport shuttle service, aviation gasoline and turbine fuel and complete maintenance. Leonard J. Povey, manager and long-time airman, says pilots bound for the Bahamas will benefit from Mackey's assistance with customs procedures, overseas clearances, routes and planning.

Conference rooms for flying executives, luxurious lounges and palm-shaded swimming pool are for use of Mackey's customers.

Are your spark plugs fouling out?

There are three common causes of aircraft-engine spark-plug fouling. Any of them can cause misfiring, rough running, hard starting or loss of power.

OIL FOULING. Plugs suffering from this condition carry a wet coating on the insulation. If this turns up in plug inspection, it's a tip-off to more serious trouble—oil is getting by the piston rings or intake valves. This may call for a cylinder change or a major overhaul.

LEAD DEPOSITS. All fuel for today's high-performing aircraft piston engines *must* contain tetraethyllead to prevent knock. When the lead has done its job, most of it is changed chemically and blown from the cylinder. No combustion process is perfect, however, and hard, shiny, ball-like deposits can build up on plug electrodes and insulators. Some of these deposits conduct electricity. So, spark gaps are altered or the voltage leaks from the center electrode to the ground electrode through the insulator deposits. The spark doesn't jump the gap and you end up with a Mag. drop and a rough engine.

The cure is simple, though. Make sure you're using the right spark plugs for your particular engine . . . and have them checked regularly.

THE "CIGARETTE." This one is easy to control. The "cigarette" is the white insulator that fits over the ignition lead wire running down to the contact button inside the top of the spark plug. Any dirt or moisture on the cigarette or inside the plug walls can short out the current before it jumps the gap. Keep "cigarettes," leads and plug wells dry and clean.

When you taxi up to the sign of the orange disc, you're within a wing span of aviation's finest family of fuels and lubricants: all grades of Gulf Avgas and Jet Fuel (filtered, cleaned and purified from storage to wing tank); Gulf Aircraft Engine Oils for those who wish straight mineral oil, and Gulfpride Aviation Series D when you want a detergent oil. For tops in performance and dependability, fly Gulf.

GULF OIL CORPORATION

GULF®
AVIATION PRODUCTS

WORLD'S LEADING SUPPLIER OF AIRBORNE WEATHER RADAR

RCA ANNOUNCES TWO NEW

AVQ-20

Lighter than ever, simpler than ever, more efficient than ever, the RCA AVQ-20 represents the most advanced airborne weather radar in existence. It is designed for aircraft ranging in size from light twins to the largest jet transports. Has excellent ground mapping properties. Compare it with anything in this field, and you will agree that here is the weather radar that best fits the requirements of modern flying.

- Weight—45 pounds
- Only 3 units—Antenna, Receiver-Transmitter, Indicator
- Range—180 miles
- Stabilized antenna with 180° scan, optional CSC² feature
- Optional bright display tube indicator
- Choice of 12, 15, 18, 24 or 30 inch antenna
- Maximum transistorization for reliability and minimum maintenance

GET THE FACTS ! *Investigate the features, the performance and dependable quality of the AVQ-20 or AVQ-55 weather radars. For details, call, write or wire:*

WEATHER RADAR SYSTEMS

AVQ-55

This radically new airborne weather radar has been designed and built with the light twin operator in mind. In power requirements, low weight and compactness it is today's best answer wherever weight, size and power needs are prime considerations. All this is achieved by an extensive use of transistors and complete redesigning of packaging and circuitry. Investigate this outstanding value.

- Weight—Less than 40 pounds
- Only 3 units—Antenna, Receiver-Transmitter, Indicator
- Range—90 miles
- 120° antenna scan
- Choice of 12, 15 or 18 inch antenna
- Very low power requirements—less than 200 VA, 400 cycle AC
- Economical to buy, install and maintain

RADIO CORPORATION OF AMERICA, 11819 W. Olympic Blvd., Los Angeles 64, Calif., or nearest Authorized Dealer for RCA Aviation Equipment.

RCA® The Most Trusted Name in Electronics
RADIO CORPORATION OF AMERICA

WORLD'S LEADING SUPPLIER OF AIRBORNE WEATHER RADAR

RCA ANNOUNCES TWO NEW

AVQ-20

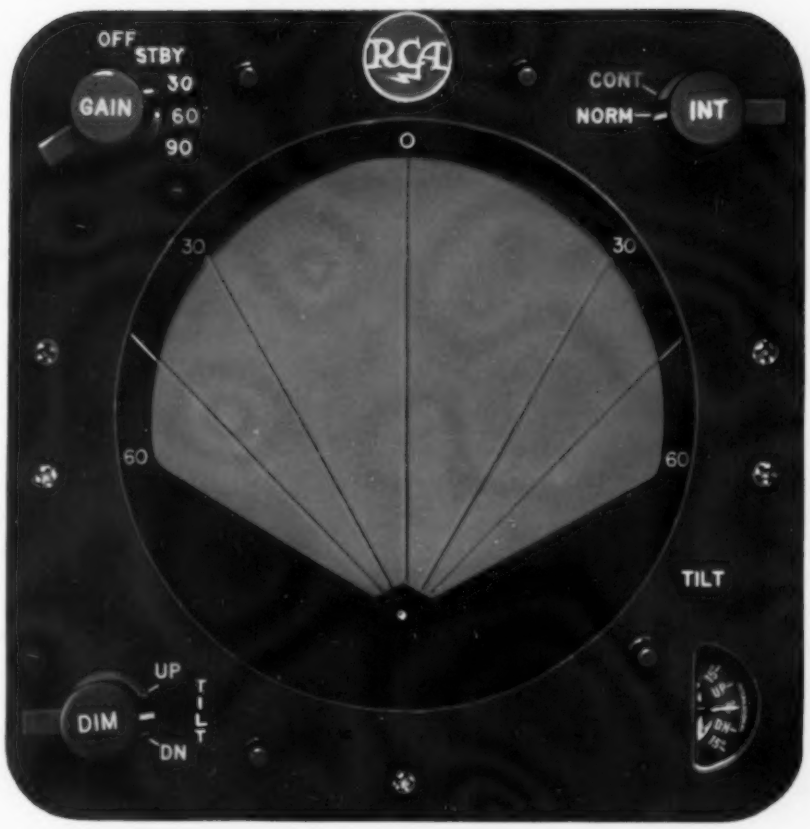
Lighter than ever, simpler than ever, more efficient than ever, the RCA AVQ-20 represents the most advanced airborne weather radar in existence. It is designed for aircraft ranging in size from light twins to the largest jet transports. Has excellent ground mapping properties. Compare it with anything in this field, and you will agree that here is the weather radar that best fits the requirements of modern flying.

- Weight—45 pounds
- Only 3 units—Antenna, Receiver-Transmitter, Indicator
- Range—180 miles
- Stabilized antenna with 180° scan, optional CSC² feature
- Optional bright display tube indicator
- Choice of 12, 15, 18, 24 or 30 inch antenna
- Maximum transistorization for reliability and minimum maintenance

GET THE FACTS ! *Investigate the features, the performance and dependable quality of the AVQ-20 or AVQ-55 weather radars. For details, call, write or wire:*

WEATHER RADAR SYSTEMS

AVQ-55



This radically new airborne weather radar has been designed and built with the light twin operator in mind. In power requirements, low weight and compactness it is today's best answer wherever weight, size and power needs are prime considerations. All this is achieved by an extensive use of transistors and complete redesigning of packaging and circuitry. Investigate this outstanding value.

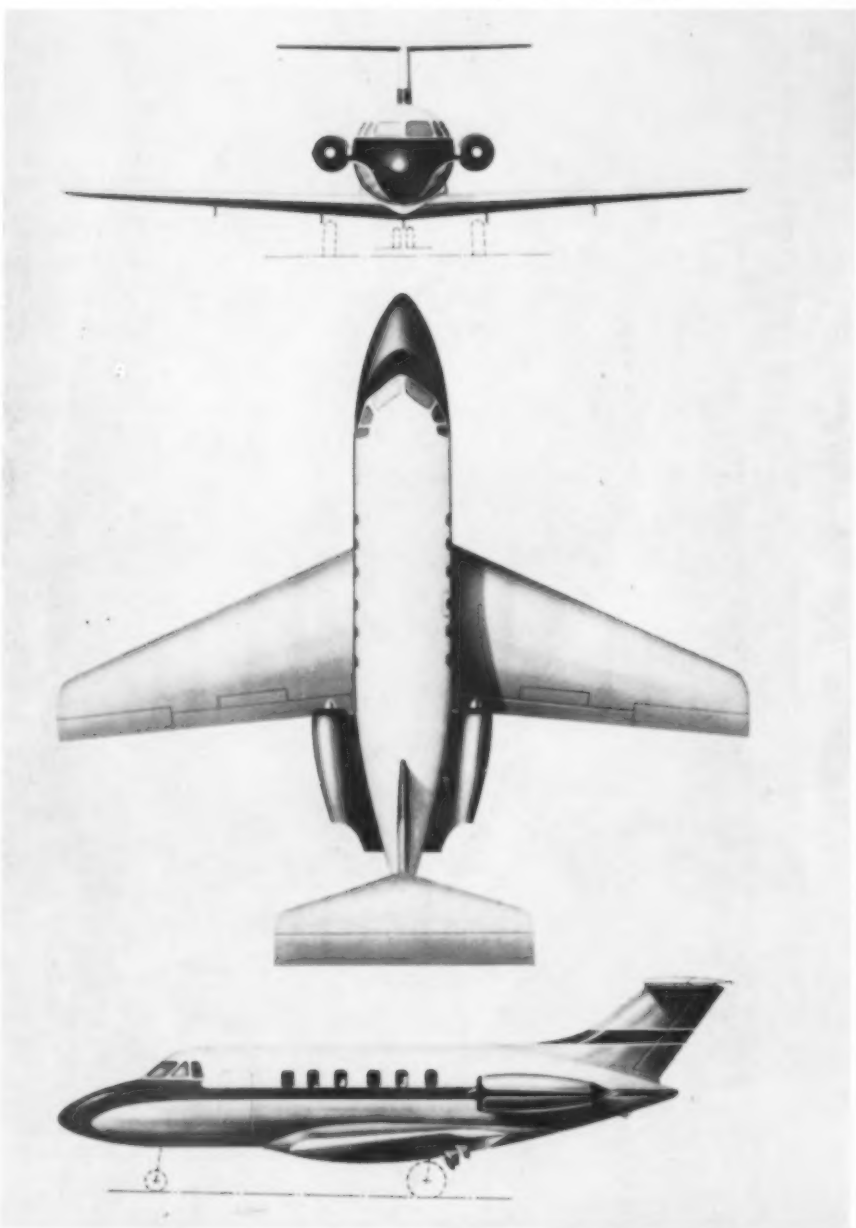
- Weight—Less than 40 pounds
- Only 3 units—Antenna, Receiver-Transmitter, Indicator
- Range—90 miles
- 120° antenna scan
- Choice of 12, 15 or 18 inch antenna
- Very low power requirements—less than 200 VA, 400 cycle AC
- Economical to buy, install and maintain

RADIO CORPORATION OF AMERICA, 11819 W. Olympic Blvd., Los Angeles 64, Calif., or nearest Authorized Dealer for RCA Aviation Equipment.

RCA The Most Trusted Name in Electronics
RADIO CORPORATION OF AMERICA

de Havilland Jet Dragon

Three-view sketch of the de Havilland DH 125 Jet Dragon shows rear-mounted engines of 3,000 lbs. of thrust each, moderate wing sweepback, cylindrical fuselage, T-tail arrangement and door sill about 40 inches above ground level. Span is 44 ft., length is 43.5 ft., and height is 14 ft. Wing area is 342 sq. ft.



CONVINCED of an immediate market for its first executive jet transport, de Havilland Aircraft Company of England has scheduled production of an initial batch of 30 of its 500-mph., 8-place, twin-jet DH 125 Jet Dragons. Production will proceed direct from the design stage, with provision for quick expansion following the initial run of 30 aircraft. The prototype will fly early in 1962 and first deliveries are expected in 1963.

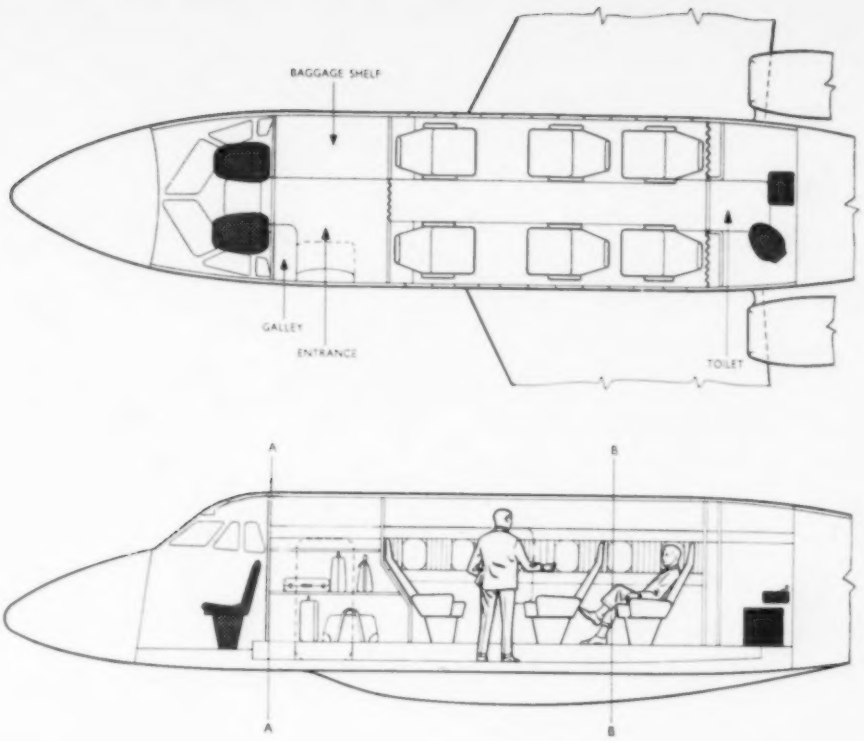
The DH 125 will be powered by two rear-mounted Bristol Siddeley Viper 20 turbo-jet engines rated at 3,000 lbs. of static thrust each. It is believed DH will also offer other jet engines on the Jet Dragon for the American market. However, only the Viper-powered Dragon has been described to date.

The new British jet executive will probably be priced at more than $500,000, will gross about 18,000 lbs. and will offer a fuel capacity of about 1,200 U. S. gallons for a range, with reserves, of about 1,500 miles at 450 to 500 mph. Detailed figures have not been released, but the Dragon can be expected to operate from runway lengths of approximately 4,000 ft. and with a single-engine ceiling of at least 20,000 ft.

Pressurized and air-conditioned to airline standards, the DH 125 will have a circular fuselage. Headroom in the 6-place passenger compartment is 5 ft. 9 ins. Cabin width is 5 ft. 10 ins. and cabin interior length is 18 ft. 6 ins.

The DH 125 cabin has a center aisle which leads aft to a toilet compartment and forward to the entrance vestibule, where space is provided for refreshment cabinet as well as baggage. The floor of the vestibule is 40 inches above ground level and provision is made for the fitting of an air-stair door.

The wing will be constructed as a single unit from tip to tip, passing



Drawings detail seating and other cabin arrangements in the DH 125 Jet Dragon. Interior cabin dimensions include length of 18 ft. 6 ins., width of 5 ft. 10 ins. and headroom is 5 ft. 9 ins. Note aisle along center of cabin, baggage and galley provisions in vestibule behind cockpit and toilet compartment behind rear seats.

unbroken beneath the fuselage. This, combined with a low aspect ratio and relatively deep section, will provide an unusually light and stiff wing structure, de Havilland says. The cylindrical fuselage rests on the wing center section, the top surface of which is dished to receive it. The wing will have moderate sweep. Rudder, elevators and ailerons will all be manually operated. High-lift flaps will be double-slotted and air brakes for speed control in rapid let-down will be used.

The use of rear-mounted engines has been discussed by de Havilland as follows: "The rear mounting of the engines confers several advantages. First and foremost, the wing can be designed for its job without the aerodynamic and structural compromises inevitable with wing-mounted engines. The result is a clean, efficient wing which, for a given amount of lift, is smaller — with less drag — and lighter than it would otherwise be, while the large, unbroken area of flap is particularly effective at the lower end of the speed scale and for landing and take-off. The aft position of the engines allows them to be close to the aircraft's center line and this virtually eliminates asymmetric power problems when one engine is stopped. It also means that the engine turbine disc will be well clear of the pressure cabin and of the fuel tanks in the wings and that the structure will be unaffected by jet noise and buffeting. Important, too, is the fact that the engine intakes are protected by the wing from the ingestion of stones thrown up from the runway."

The Bristol Siddeley Viper 20 engine adopted for the Jet Dragon is basically a Viper 11 engine with a zero stage added to the compressor for more thrust and reduced fuel consumption. The improvements are said to be accompanied by a decrease in the already low working temperature of the engine, promising greater reliability and longer overhaul life. The first Viper jet engine ran in 1951. The first production version was the ASV 3, used in the Jindivik target drone. It was followed by the ASV 5 and 8, which powered later Jindivik models and the RAF's Hunting Jet Provost primary trainer. The ASV 8 developed 1,750 lbs. of thrust and is still in production. Latest version is the ASV 11, of 2,500 lbs. thrust, which powers the Italian Air Force's Macchi 326 jet trainer as well as latest version of the Jindivik and Jet Provost. Basically a Viper 11, the Viper 20 is thus seen to have a background of more than 10 years of development and production.

de Havilland describes the DH 125 as "a long-term project, involving a private venture of several million pounds (about $10 million—Editor)" and says the Jet Dragon "is well suited to occupy the technical staffs who have been responsible for the Comet and Trident jet airliners. It will benefit greatly from the years of research which yielded the Trident design, and deliveries will commence in 1963." The Jet Dragon is pictured as a "major project" for DH, a member company of Hawker Siddeley Aviation, and is part of Hawker Siddeley's concerted plan to go after worldwide civil aircraft markets in the immediate future. DH was the world's first aircraft company to design, manufacture and certificate a jet airliner.

The Dragon will carry about the same payload in people and baggage as the piston-powered twin-engine executive de Havilland Dove and de Havilland says operating costs of the Dragon will be almost exactly the same as those for the Dove — on the basis of aircraft miles flown. This, according to DH, is about two shillings and five pence per statute mile (about 34 cents U. S.). The reason is that the Dragon will fly more than twice as fast as the Dove, based on average trip lengths of 500 miles. On longer stages, the Dragon shows up even better. While the Dove delivers about 71,500 miles of transportation per year based on 500 hrs. of utilization, the Dragon would cover more than twice the mileage, or 166,500 miles, in the same number of hours, using an average trip length of 500 miles. Thus both the aircraft's annual utilization and the businessman's travel time would be cut by more than half.

Designed and built to meet maximum specifications of pilots and passengers, the Beechcraft Queen Air can fly at speeds up to 239 mph, carries 6 or 7 people in luxurious comfort and quiet. Its folding air-stair door provides easy entry and exit. Optimum range, with fuel reserve, is over 1,200 miles. Supercharged fuel injection engines.

Big separate pilot compartment offers unsurpassed comfort and visibility. Flight-planned instrument panel.

Even long trips seem short in the quiet, relaxing Queen Air cabin. Sliding door privacy for pilots and passengers.

Completely private lavatory. Big inside baggage compartment is easily and quickly accessible in flight.

How To Sell The "Boss" A Beechcraft Queen Air:

The "boss" may be the board of directors, a department head, or maybe he's you. In any event, you owe it to the "boss" to learn all the advantages of the Beechcraft Queen Air—advantages that no other aircraft today can offer. For example:

1. Roominess for both pilots and passengers. And sliding door privacy for both. Center aisle. Freedom to move about, and room to stretch.

2. "Man-type" comfort. Big, deep-cushioned individual reclining chairs in which to work in comfort, or to relax and snooze in peace and quiet after a hard day's work. Private lavatory.

3. Extra utility and performance. The Queen Air's 2 powerful supercharged fuel injection engines give you power to spare to top terrain and most weather with ease, plus precise fuel metering, smoother running, longer engine life and complete freedom from carburetor icing problems. Jato power is available, too, if you want it.

4. All-weather usefulness with custom radar and de-icing equipment, plus a wide range of factory-installed radio and navigation equipment.

5. Extra rugged construction that lets you operate into and out of small unimproved fields with confidence and keeps maintenance costs down.

Why not get all the facts—and a demonstration from your Beechcraft distributor or dealer—soon? There's no better time than now!

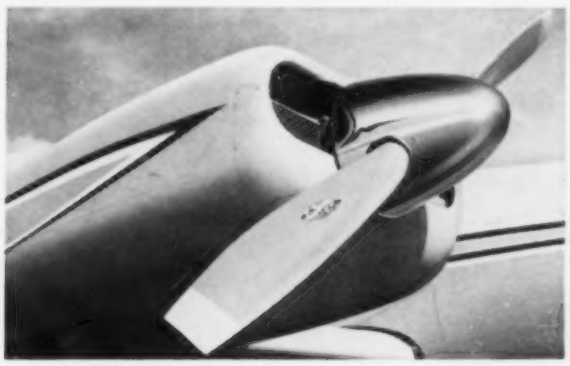
Write today for latest information on low-cost Beech leasing and financing plans. Address: Beech Acceptance Corp., Wichita 1, Kansas, U. S. A.

Beechcraft

BEECHCRAFTS ARE THE AIR FLEET OF AMERICAN BUSINESS

You have to fly in it to believe the comfort, performance and quiet of this exciting new Beechcraft Baron. With a wide choice of power settings, it can deliver speeds up to 236 mph, and can cruise over 220 mph at only 65% power. Optimum cruising range, with 45 minute fuel reserve, is over 1,200 miles.

Nobody's crowded here! The new Beechcraft Baron offers individual seating for 5 big people—plus room for their baggage in 2 compartments.



Two 260 hp Continental fuel injection engines give you smoother running, more precise fuel metering, and complete freedom from carburetor icing.

Why The Beechcraft Baron Outclasses Every Other Twin Anywhere Near Its Price:

When you compare what you get in the new Beechcraft Model 55 Baron, it's easy to see why so many professional pilots agree that it's the best investment, dollar for dollar, that you can make in a 5-place light twin. That's why the new Baron is one of the fastest-selling aircraft in Beech history.

If you haven't yet seen and flown the new Baron, you owe it to yourself to do so soon. From the time you open the throttles for take-off until you ease it gently back onto the runway at the end of your demonstration flight, you'll be asking yourself how any airplane with the Baron's performance can be so easy to fly.

Even fully loaded, the Baron gets off fast, climbs rapidly at good cross-country speeds. And when you level off at altitude, see how the Baron really moves out. With the ability to cruise over 220 mph at only 65% power, you eat up the miles in a hurry. As you maneuver, notice how smoothly the Baron rolls into and out of turns, and how easily it handles even at low air speeds.

Like all Beechcrafts, the new Baron is built to exceptionally high standards of craftsmanship to give you many long years of faithful service at low maintenance costs. Why not make a date to see and fly the new Beechcraft Baron yourself—soon?

Write today for latest information on low-cost Beech leasing and financing plans. Address: Beech Acceptance Corp., Wichita 1, Kansas, U. S. A.

Beechcraft

BEECHCRAFTS ARE THE AIR FLEET OF AMERICAN BUSINESS

Here's some of the Beech radio modification center's $350,000 worth of test equipment.

Boom In Beech Factory Radio Installations

THREE years ago a growing number of Beech customers started ordering radio installations in new production airplanes at the factory to such an extent that a small radio modification center was established to handle the business. The first year the "company within a company" grossed $1 million. Last year volume totalled $5 million and the center is no longer "small."

Al White, 21-year Beechcraft veteran, who moved from the Beech production lines to take over management of this booming department, admits the business simply grew "like Topsy" with no pushing on the factory's part. Says White: "We're in business for the customer and if he demands factory radio installations, we're going to provide them. As a result of this philosophy, we've assembled the finest equipment and personnel money can buy in order to handle these custom installations."

White's radio modification center is the result of the trend toward owners desiring their new airplanes to be delivered completely equipped and having the electronics equipment engineered and installed during the final assembly process rather than after the airplane is delivered to home base. This eliminates make-shift and temporary installations for the delivery flight as well as costly modifications in wiring, panel arrangements and placement of the permanent equipment after the airplane has been "wrapped up."

White estimates that there are over 500 different ways to install and present an average Beechcraft electronics system. This makes pre-planning one of the most important factors in satisfactory custom radio installations. According to White there are about 1,000 combinations from which to choose, what with all the communications and navigation equipment on today's market. When the customer determines after considerable study and consultation exactly what equipment is to go into his airplane and the particular instrumentation system desired, a requirements sheet is prepared and copies sent to every person concerned with the installation. From these very detailed specs the engineers prepare wiring diagrams, one set of which is

(Continued on page 67)

Beech Radio Manager Al White (right in photo at left below) is shown with Orin (Moose) Redhead of Bendix examining a custom radio panel and a Bendix weather radar antenna. Photo at right shows some of numerous aircraft mockups used by Beech to test wiring systems prior to installation.

The HOWARD "500"

The most efficient high performance (350 mph.) long range, pressurized airplane ever built.

FLIGHT for FLIGHT, TRIP for TRIP, the HOWARD "500" will fly its passengers with more advantages than any other aircraft on the market today. It will maintain lower cabin altitude, make more non-stop flights and have greater fuel reserve to allow maximum freedom in flight planning. Its easy 350 mph. cruise for 2600 miles can be obtained in a wider range of temperature and altitudes. It will operate in and out of more small airports with airline safety.

In addition to "ocean voyage breathing," passengers find the HOWARD "500" full of pleasant surprises—offering comfort not matched in any other aircraft. This starts with the easy one-step cabin entrance into cheerful surroundings that are functional as well as pleasing to the eye. Once underway in flight, the low cabin sound level is particularly noticeable because of the absence of voice-frequency interference.

In no other aircraft can you obtain the unparalleled advantages of the HOWARD "500."

It is easier to talk and be heard in the HOWARD "500" than any competitive aircraft. Also, the absence of performance and economy robbing bulk in the size of its fuselage serves a dual advantage — it allows the seats to be spaced ideally for conversation without taking the passengers away from the windows. Each passenger is seated by large summit-view windows which reveal the beauty of flying that is rarely achieved in pressurized aircraft.

HOWARD Aero. INC. MANUFACTURING DIVISION

TAylor 4-2411 P. O. BOX 8247 • INTERNATIONAL AIRPORT • SAN ANTONIO 12, TEXAS

Some $40,000,000 worth of new Gulfstreams and equipment for them have been delivered to corporate customers on this Atlantic Aviation ramp. Five of the Grummans are shown in this picture—two more are inside the hangar. Atlantic Aviation is distributor for Beech and Grumman.

3 Years And 30 Gulfstreams Later

How Atlantic Aviation launched sales of million-dollar business planes

THREE years after becoming a sales and service center for the million-dollar, 350-mph. prop-jet Grumman Gulfstream, Atlantic Aviation Corporation at Wilmington, Delaware, last month sold its 30th Gulfstream — almost half of all of the 70 Gulfstreams which have been delivered. No business aircraft ever built has come anywhere near matching the Gulfstream's sales record in dollar volume during such a short time and Atlantic Aviation's sales job with it tops anything ever achieved in aircraft sales by fixed-base operators.

Latest Atlantic Aviation sales activity was an overseas demonstration tour. During the first 90 days abroad, the demonstrator logged 240 hours of sales-flying in 27 countries of Europe, Africa and the Middle East. It was a hit at the Paris Air Show and no less a performer crossing the Atlantic, Saudi Arabia and Africa. Temperatures and humidity ranged from one extreme to another, as did airport facilities, and the airplane's custom cabin interior was enjoyed by business leaders, royalty and heads of state, sheiks and tribesmen (replete with machine guns, knives and hand grenades)

This overseas demonstration confirmed the modern turbine-powered business aircraft as truly global in its capabilities — 95% of all starts were by ship's power and its air conditioner ran continually but other than normal periodic inspections performed in England, maintenance consisted of replacing two nosewheel tires, a tachometer generator and some cockpit lightbulbs. More than 500 guests tried out the custom interior.

Atlantic Aviation is the first aircraft distributor to acquire, equip and operate a turbine-powered demonstrator representing an investment of over a million dollars. It maintains not one but *two* Gulfstream demonstrators — one for domestic sales and the other for overseas sales. It completed its first Gulfstream demonstrator just before the 1960 National Business Aircraft Association's convention at Los Angeles. This one was sold immediately thereafter and five demonstrators following it have likewise been sold, all helping to make several additional sales. A sixth Atlantic-owned Gulfstream demonstrator will make its first public appearance at the NBAA's 1961 annual convention in Tulsa.

Atlantic Aviation's Gulfstream program is as complete as it is unique. It covers sales, financing, insurance, custom-designed and custom-installed electronics systems and interiors, pilot training and check-out, complete maintenance and service and quick engine-change service. It performs all of these services at one location, under one roof and under a single, undivided responsibility.

But the leading Gulfstream distributor did not start that way, as pointed out by W. E. Richards, president. "Three years ago we had several sales jobs to accomplish — the main one to convince Gulfstream prospects that Atlantic could and would market million-dollar turbine aircraft with complete services and standards matching those which had won for us an outstanding reputation in business aircraft sales and service since 1927; Atlantic is one of the oldest and busiest Beechcraft distributors."

The firm's expansion of its Wilmington operation to handle Gulfstreams and larger aircraft was directed by Engineer-Pilot Donald R. Redpath, who had been Atlantic's Philadelphia manager. He and Service Manager Joseph L. Rhodes doubled Wilmington's shop forces in three years to more than 200 skilled workmen. The shop was split down the middle into modification and maintenance, with double-check inspection systems in both areas.

The maintenance group was further split into Gulfstream and other large aircraft in one group and lighter aircraft in another group. Gulfstreams account for only about one-third of the total shop activity.

Today, the Wilmington facility can handle 3 Gulfstream completions at one time, plus an additional 3 at the same time for maintenance and inspection, and exclusive of a full workload of other heavy twins, light twins and single-engine aircraft. It is not uncommon to see a Lodestar, a DC-3, several Tri-Pacers and a couple of Bonanzas sandwiched among Gulfstreams and Super 18's. The premium is on efficiency.

"Gulfstreams were originally completed, or fully equipped, and delivered within 90 days, but current deliveries are made in 60 days or less," Redpath reports.

Launching the Gulfstream program involved other problems. One basic step was Atlantic's purchase of a DC-3 for complete rebuilding, including an 8,000-hr. overhaul — primarily for training values. It revealed weak points in shop preparations, it uncovered many shop talents — the DC-3 involved major airframe modifications, complete electronics installations, a custom interior and painting. New custom aircraft design concepts went into it and the Atlantic 3 stimulated interest nationally as a demonstrator — 2,500 business aviation leaders inspected and looked it over. This DC-3 project was carried on while Atlantic's personnel attended Grumman and Rolls-Royce training schools.

Meanwhile, a salesman specializing

To dramatize its advertisements, an insurance company posed an "order taker" atop one of Atlantic Aviation's Gulfstream demonstrators and got this picture. First aircraft distributor to invest in a million-dollar demonstrator, Atlantic is now flying its sixth Gulfstream demo. The one above was sold last month.

Executive interiors installed in Gulfstreams by Atlantic Aviation are the custom work of a team of industrial designers, engineered to obtain most efficient utilization of the cabin in corporate flight operations. View above looks aft, that below looks forward.

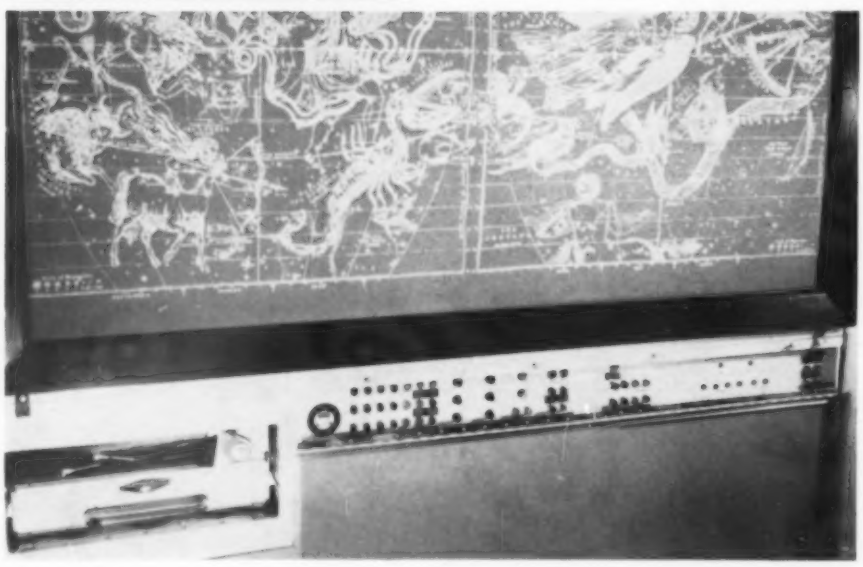
Folding jump seat seen in refreshment cabinet below and at right can be used on take-offs or landings as well as during flight. It slides into cabinet when not in use.

in the Gulfstream was launched on a career new to aircraft distributors — knocking on doors to sell a million-dollar airplane. This salesman was Alan M. Scripture. He was a non-pilot, new to both Atlantic Aviation and to business aviation. But he sold four Gulfstreams before Grumman flew the prototype on its maiden hop. To make his sales pitch, Scripture relied on interior color renderings of proposed installations, some photos, the DC-3 guinea pig project, company reputation and background and some Grumman literature. Demonstrations were scheduled and coordinated with the factory, which also demonstrated for other distributors. In sharp contrast, Scripture now has two Atlantic demonstrators at his command and satisfied owners of Gulfstreams as well as performance records to go on.

"The Gulfstream is accepted universally as a fine business aircraft so that the product itself is never in doubt — the basic selling job boils down to a prospective customer's million-dollar decision to take high-level executives out of older and slower airplanes and place them into a high-speed, pressurized business aircraft," Scripture says. "Factors affecting such a decision are frequently confined to a firm's Board room and are difficult for a salesman to influence. But a prospect's competitor traveling in a Gulfstream helps the situation. Gulfstream prospects are fairly well defined. To my knowledge, only one Gulfstream has been sold in the United States to a company that never owned an airplane — all the others went to top firms which have used business airplanes for years."

Chronology of Sales

It is interesting to note the chronology of Gulfstream sales by Atlantic Aviation, because this provides an indication of both the market for a million-dollar airplane and the actual experience of a pioneering sales program. Sales effort began in the last quarter of 1958 and during those three months 2 sales were made. Sales effort gained momentum and during the 12 months of 1959, 13 orders were booked by Atlantic. However, they were not booked evenly on a 1-per-month average, as the figure might indicate. Instead, 2 were sold in March, 1 each in May and June, 1 in September, 1 in October, 3 in November and 4 in December. With only 4 sales, the first half of the year was not as active as the last half, when 9 were sold — 7 of them in the last two months. For the year 1960, prospects were fewer after 15 months of sales work. During the first half, 3 were sold — 1 in January and 2 in April. Five were sold in the last half — 1 in October, 2 in November and 2 in December — again establishing the last two months of the year as the most productive time of year for airplane sales. Then the picture changed in 1961, Atlantic



Interesting utilization of the Gulfstream's entrance vestibule is shown in these pictures, looking forward (left) and aft (lower right). Slide-out folding jump seat is shown at left. Below, it is retracted and out of the way, adjacent to the ship's radio racks and circuit breakers. Toilet compartment is shown at right.

For real freedom . .
TRY A BELL!

If you'd like to shake off the frustrations and irritations of today's travel, try a taste of freedom . . charter a Bell! You'll find out what *real* independence means, for the self-reliant Bell lifts you free of city traffic . . spares you the galling trips to and from airports.

You're not bound to the fixed routes of fixed wing travel . . the Bell is completely independent of runways or landing fields. Most important of all, the Bell *frees your time*, giving you back extra hours for productive use, boosts efficiency . . *pays out.*

We suggest you try a Bell helicopter for an hour, a day or a month and find out these facts for yourself. Chartering a Bell is as simple as renting a car; rates are reasonable. Write us today for names of Charter operators nearest you. **Address:** Commercial Sales Manager, Dept. 411I, P. O. Box 482, Fort Worth, Texas.

BELL HELICOPTER COMPANY FORT WORTH, TEXAS

A DIVISION OF BELL AEROSPACE CORPORATION

A TEXTRON COMPANY

INTRODUCING THE NEW MOTOROLA M-4

AUTOMATIC FLIGHT
CONTROL SYSTEM

THE FIRST MAJOR ADVANCE IN FLIGHT CONTROL FOR GENERAL AIRCRAFT IN OVER A DECADE

COMPLETE AUTOMATIC CONTROL FROM TAKE-OFF TO TOUCH-DOWN:

- AUTOMATIC 3-AXIS CONTROL
- CONSTANT RATE TURNS
- CONSTANT RATE CLIMBS
- CONSTANT RATE DESCENTS
- AUTOMATIC ALTITUDE HOLD
- AUTOMATIC PITCH TRIM
- ROLL TRIM ADJUSTMENT
- AUTOMATIC YAW DAMPER
- AUTOMATIC HEADING HOLD
- AUTOMATIC VOR NAVIGATION
- AUTOMATIC ILS APPROACH
- FLIGHT PATH INDICATION
- FLIGHT PATH MONITORING
- BACK COURSE APPROACHES

See your Motorola dealer for a flight demonstration or write us for full details.

MOTOROLA
AVIATION ELECTRONICS, INC.

A SUBSIDIARY OF MOTOROLA, INC.
0916 W. Washington Blvd., Culver City, Calif.

notching 7 sales during the first 7 months.

According to Richards and Scripture, the market continues to look promising for Gulfstream sales. "There are many U. S. prospects and a number of them are interested in a second or a third Gulfstream," says Richards. He also believes the overseas market will produce more sales.

In a Gulfstream sale, the usual procedure is the down-payment of $100,000 at the signing of the purchase contract, a partial additional payment prior to delivery of the airplane, and the balance upon delivery. Complete airborne electronics packages and custom interiors are purchased with the same procedure.

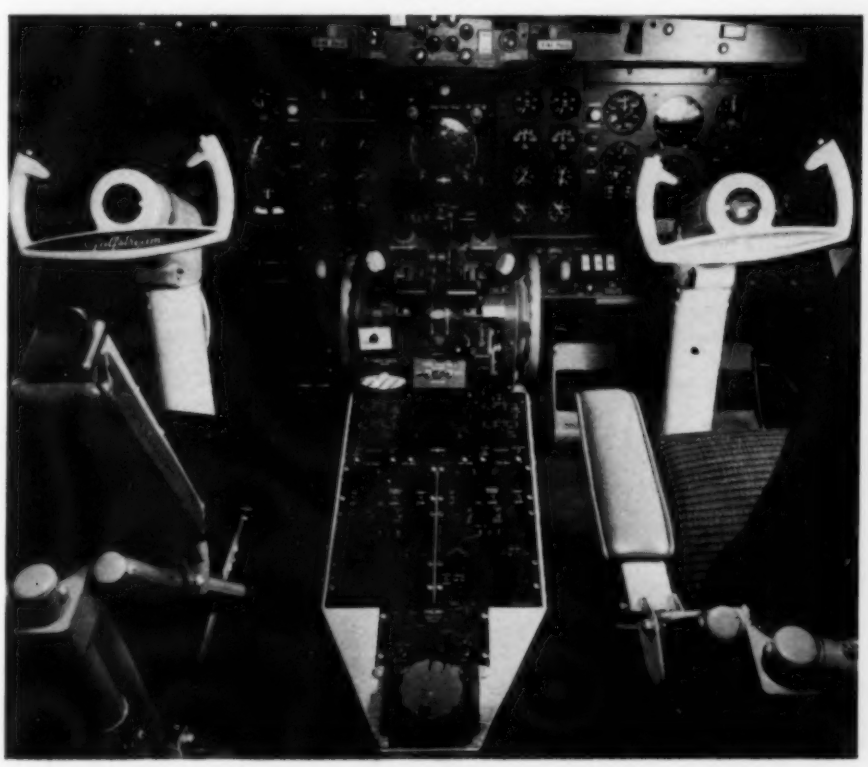
Financing plans for either purchase or lease can be arranged by Atlantic through its subsidiary, National Financing, Inc. Long experience in corporate aircraft sales, financing and insurance speeds negotiations (at the moment, Atlantic and National Financing own about seven million dollars in aircraft).

17 Custom Installations

Since Atlantic expanded to undertake the Gulfstream program, it has completely equipped 17 Gulfstreams (several were reluctantly turned away because the shops were booked to capacity in early stages of the expansion). Grumman delivers the Gulfstream without equipment or interior finishing so that purchasers can specify their exact requirements from Atlantic and other custom shops. Atlantic interiors are designed and engineered by a team of eight design engineers (including three industrial design graduates) and draftsmen. Chief Designer Richard Kraus had never seen the inside of a business plane when he came to Atlantic from a major firm's design department. Instructed only to "study what has been done by others but do not be influenced by anything you see," Kraus attended the 1958 NBAA convention at Philadelphia and spent all his time at the aircraft exhibit, examining interior details of scores of business planes. He took hundreds of photos.

What Kraus saw in the larger aircraft didn't impress him — not enough attention seemed to be given to basic interior engineering and design and methods, materials and techniques seemed lagging behind newest developments. The "state of the art" in executive interiors, however, did suggest to Kraus an idea of what business leaders wanted in their planes and he and his team began developing their own sketches, engineering drawings and innovations, working closely with the

Here's a typical Gulfstream cockpit as equipped by Atlantic Aviation to meet custom requirements. Grumman delivers Gulfstreams bare and purchasers specify custom completion with many variations in electronics and other equipment, cabin interiors and paint jobs.



Grumman factory with first-hand measurements and data for structural mating of furnishings and the aircraft. Among the features they originated were a disappearing "jump" seat which folds into a refreshment cabinet, and an easily removable one-piece air-duct-with-hand-rail combining oxygen and fresh air outlets, reading lights, fluorescent lights and impact lights. The firm and its customers find it ridiculous to incorporate anything less than the finest materials because the $50-per-cubic-foot or more cost of an interior still represents only a small fraction of the investment in a million-dollar airplane. Good interior design is a task for professional industrial designers, says Kraus, emphasizing the need for continuous advancement of the state of the art.

Special Jump Seat

The Atlantic jump seat — only one for Gulfstreams STC'ed with approval for take-off and landing occupancy — was designed and engineered by Clyde Heaton, Atlantic's FAA-designated structural engineer. The seat not only folds up but also slides out of the way and into the refreshment cabinet. Thirty-seven of these jump seats are now in use. C. (Fitz) Fitzpatrick, modification foreman who supervises Gulfstream completions, says Atlantic's metal work duplicates Grumman standards. All placards are engraved (some 100 per Gulfstream). A specially-designed and STC'ed baggage compartment smoke detector is featured, as is use of muslin under dado; all fabrics are edge-bound and all seat fabrics have snap fasteners; cabinet drawers are cork-lined and slide on nylon rollers.

Fitz has 12 teams for Gulfstream completions, each specialized for specific jobs. One handles metal, electronics and oxygen; another bulkheads and galleys, while a third specializes in cabin upholstering and still another routes and checks wires and cables. Each lead man (averaging 20 years of experience) makes preliminary inspections, followed by two subsequent checks plus continuing inspections by supervisors. Before a completed Gulfstream receives its final FAA check, Atlantic conducts its own 76-point detailed inspection. (Item 57 certifies that a smoke test has been run on the smoke detector). This minimizes the time required by FAA, which averages only two or three hours.

Atlantic has perfected Gulfstream soundproofing after extensive development and experimentation with an insulation manufacturer. This is true with Gulfstream painting, too. The use of epoxy enamels was perfected on smaller aircraft on which adhesion and lustre problems were conquered — a special masking tape was developed to keep the epoxy from leaking under and spoiling lines. George Brume, chief painter, recently began using an airless method of spray painting which not only reduces time required but allows other aircraft work as close as two feet to be continued. This reduces overspray to only 3% of that encountered with other methods.

Groundwork for Atlantic's Gulfstream work is a careful preparation of each new Grumman as it arrives from the factory. A "preparatory procedure before modification" lists 40 items to be checked off first, including such things as "11. install ventilation fan, electric and air outlets; 12. remove flooring; 13. install protective flooring; 23. remove instrument light panel, disconnect plugs from lights and tape plugs; 37. install protective pads on aft outboard end of each flap."

Sketch Books As Guides

Atlantic thoroughness includes preparation of seven detailed sketch books, covering every area of the Gulfstream. Immediately available to modification men, they eliminate lost time requisitioning original prints and cover parts, sketches, dimensions and construction techniques.

C. I. (Newt) Newton, in charge of designing custom Gulfstream electronics installations, emphasizes simplicity and workability. Atlantic's first demonstrator had a complete Collins package including the first AP-103 autopilot in a Gulfstream, with Atlantic getting the original FAA certification in less than 10 days after roll-out, including design, flight testing and final certification. The firm's sixth demonstrator will also feature a complete Collins package, including the new lightweight radar and Doppler. The Wilmington shops are completely equipped for follow-up servicing of modern electronics systems, including autopilots, transponders and DME in addition to sophisticated nav-com gear.

It's not uncommon to see eight Gulfstreams on the Atlantic ramp and in the hangar undergoing periodic inspections or completion. Les Wolfe, in charge of maintenance, has a specialist team trained by Grumman to handle all Gulfstream work. It can handle two to three periodics a week, has performed about 30 Gulfstream periodics and one 1,000-hr. inspection to date. A Gulfstream periodic requires three days including 125 man-hours and costs about the same as that for a DC-3. Basic differences are materials, modern methods and more extensive electronics. It all calls for specialization and training in Atlantic's classrooms is conducted by experts from Grumman and Rolls-Royce.

As part of its complete Gulfstream service policy, Atlantic offers a quick-engine-change package plan, maintaining a QEC unit, ready to be installed on a moment's notice. It can be installed overnight or in one full working day when necessary.

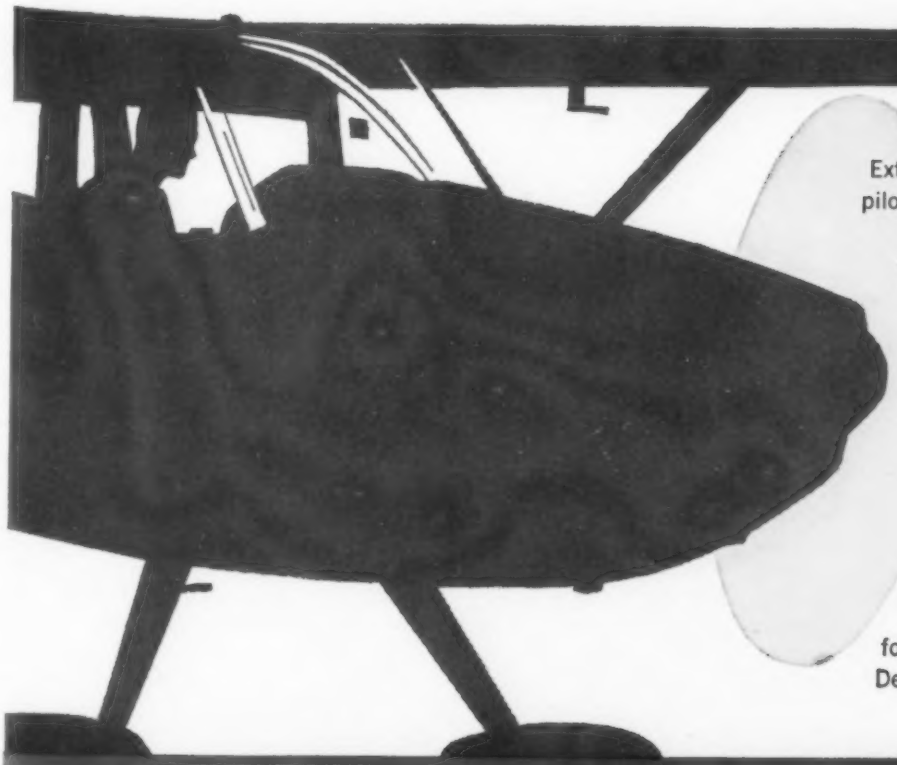
Crew Training

Its pilot-training program is unique and has checked out eight customer crews at this writing. Robert J. Whempner does most of the flight training and route checking. One of Atlantic's three Gulfstream captains, he literally lives with the crews he trains after they have been through the Rolls-Royce and Grumman schools. He says: "Although customer pilots are pro's, no two of them have the same habit patterns, so we get to know them and their background before adapting our training technique to each individual. We just help them learn the aircraft and develop the proper techniques."

In the early stages of accepting the responsibilities of a million-dollar machine, a crew tends to extreme cautiousness in the unfamiliar aircraft, but enthusiasm and interest are high. Whempner lives with the crew and the handbook to the point of quizzing them during meals. Somewhere between the 5th and 7th flight hours, emergency procedures have been completed and enthusiasm soars from this point on. An Atlantic-designed two-page cruise-control review sheet illustrates the thoroughness used. An 8-page check-out review (pilots memorize the first three pages) helps speed the process and includes a cheat-sheet for rapid cruise control calculations. In the final stages of check-out, including flying the jet-stream, Whempner rides the jump seat. Co-pilots on Gulfstreams can be busy — check points come up twice as fast as in slower aircraft, check lists must be done earlier and cruise control is watched more closely. Three layers of airways traffic require additional attention.

"The Grumman Gulfstream has opened the door to a completely new era of high-speed business communication," says Richards, president of Atlantic Aviation. "Our firm is proud of its part in developing this era. But, however bright the business flying future may appear, its continued advancement depends on the imagination and energy of those who work for constant improvement and we intend to lead the way."

INTRODUCING THE NEWEST ASHLESS DISPERSANT OIL THAT'S BEEN FLIGHT-TESTED FOR OVER 15 MILLION ENGINE MILES!



ESSO AVIATION OIL E

Extensive flight tests by airlines and private pilots prove that this new ashless dispersant engine oil helps keep engines clean . . . thus reducing wear and oil consumption. In addition, because its additives are ashless, Esso Aviation Oil E does not induce spark plug fouling. As a result of the unusually high performance characteristics of this new oil, only two grades are needed to provide the full viscosity range for piston engines in all seasons. New Esso Aviation Oil E has been cleared for use by every major U. S. aircraft engine manufacturer. For further information, see your nearest Esso Aviation Dealer or write to us at 15 W. 51st Street, New York 19, New York.

HUMBLE OIL & REFINING COMPANY

Operating Beechcraft Twin-Bonanzas and Bonanzas on frequent schedules between Albuquerque and Los Alamos under contract to the Atomic Energy Commission, Carco Air Service is an example of "third-level" air service. Carco's operations were patterned to fit the needs and limitations of the city of Los Alamos, its air strip and its people.

—(FLIGHT MAGAZINE Photo.)

Needed: A Third Level Of Air Service

PART II

By E. H. PICKERING

HOW can a third-level airline be defined? What clearly differentiates a third-level airline from any of today's local service airlines, for example? A third-level airline would provide a service required by the public's need that is not being provided today, or is not being *well* provided today.

Under this definition, third-level airlines would (1) serve communities not presently on the airline map, (2) serve with greater frequency between communities presently receiving only a token service, or (3) serve between cities presently receiving adequate service frequency, but using other airports that would more conveniently serve sections of the public on relatively short-haul but dense traffic markets.

Examples of each of these types of operation exist today as specialized cases. Aspen Airways, operating daily scheduled service between Aspen, Colorado, and Denver, serves a community not otherwise receiving airline service. Carco Air Service, under contract to the Atomic Energy Commission, provides daily scheduled, frequent service between Los Alamos, N. M., and Albuquerque. Both of these are examples of (1) above.

Operating nine daily round trips between Phoenix and Tucson in Arizona, Apache Airlines is a good example of (2) above, providing more frequent service than American, TWA and Frontier, combined.

TAG Airlines operates eight daily schedules each way between Cleveland's Lakefront Airport and Detroit City Airport and is an example of (3) above. Both airports are close in and neither airport is served by any other airline. Commuters on the 45-minute flights between these two cities can save up to four hours of surface travel time required when using other airlines.

All of these examples-in-being of third-level airlines *use aircraft smaller than those in use by even the local service airlines.* These and others like them use mostly light twins such as the Twin Bonanza, Aero Commander, Dove, and D-18 Beech.

Right now, before there is a full-grown third-level airline system, is probably the only time that a "typical" third-level operation can be considered. Once such a system is developed nationwide, it will be as impossible to choose a typical operation as it is today to choose a typical local service operation.

In 1960 the local service airlines had the following variations (just as examples): in average passenger load, from 8.2 passengers to 18.7 passengers; in number of aircraft, from 10 to 39; in route mileage (unduplicated), from 1,937 to 6,089; in frequency of schedule, from an average of three one-way flights daily to 8.9; from 98 departures per day to 481; from 493 employees to 1,995; from 21 cities served to 84. To an even greater extent will individual operators in a third-level network vary. However, let's assume a typical third-level operation serving ten cities over some 750 route miles with an average of two daily round trips over each segment for 3,000 miles to be flown daily. What considerations will determine an operator's control of direct operating costs and revenues, once such a route pattern is selected?

Direct Costs Itemized

In choosing equipment, the considerations must include (1) ease of handling by a single pilot to assure maximum safety and reliability with emphasis on pilot visibility, (2) passenger capacity with reference to the anticipated traffic over the chosen routes (remember, passenger capacity is tied to gross weight which in turn is tied to power which in turn affects fuel and maintenance costs), (3) ease of passenger entrance and egress and of passenger comfort and visibility when seated, (4) choice of used or new equipment with consideration to improvements in latest models vs initial cost and depreciation, (5) ease of maintenance of both airframe and engines for maintenance will probably be the highest single element of direct operating costs.

What about the direct operating costs for such a third-level operation? What justification is there for the less-than-30¢-per mile figure stated in Part I of this series last month?

Analysis has been made of the direct

IN PRODUCTION . . . Production on the new Super-V is now underway. The 200 mph executive transport is powered by two new Lycoming 0-360 engines. Fully certificated, it is being manufactured under FAA type Certificate No. 4A29.

HAMMOND AIRCRAFT COMPANY

(FORMERLY SUPER-V CORPORATION)

867 AMERICAN STREET • SAN CARLOS, CALIFORNIA

operating costs of a light-twin in a scheduled airline operation environment following flights over a test route. Analysis has also been made of a light-twin operation as it could be handled by a local service airline. Analysis has also been made of two actual operations in the third-level category. All of this has been done by the Author. On this basis, the following figures have been developed. For each category, they show a high and a low figure, a probable average, and the variables that will affect the outcome.

Pilot pay is dependent upon two items. First is the pay scale for which qualified pilots can be obtained, and the second is the number of hours per month that these pilots can be utilized.

In some areas pilots can be found to handle this type of operation at less than $600 per month. In other cases $800 per month seems more normal. Airline captain pay scales of the local airlines would run over $1,000 a month. The FAA limits pilots in scheduled passenger-carrying operations to a maximum of 100 flying hours per month. The airlines, themselves, have an 85-hour maximum. Depending upon the operation, its route pattern, its schedules, its ingenuity in assigning pilots, and the cooperation of the pilots, pilots will average between 70 and 80 hours a month of flight time.

When these monthly pay scales and average flight times are computed against one another, the pilot cost per flight hour can be seen to vary between $7.50 and $14.29 per hour, with an attainable average at about $12.80 per hour.

When pilots are away on flights, their meals, lodging, and taxi (where required) are normally paid by the airline. In practice, this cost varies between $1 and $3 per flight hour (to which it actually has very little reference), but a figure of $2 per flight hour should amply cover most situations.

Fuel and oil costs depend mostly on the aircraft-engine combination to be used. For operations of this size, where most of the fueling can be handled at only one or two points on the system, favorable contracts with an oil company should permit fuel and oil costs to range between $6 and $9 per flight hour with a $7.50 average conservative.

Aircraft hull insurance and PL&PD insurance for an FAA-regulated, scheduled air carrier operation should be obtainable at a premium between 2% and 3% of the valuation per year. Assuming valuation extremes between $50,000 and $100,000 per unit and aircraft utilization extremes of between 1,500 and 3,000 hours per year per aircraft (4 to 8 hours per day), we estimate these insurance costs to range from 30¢ to $2 per flight hour, with an attainable average of $1.60.

Workmen's compensation, insurance, group insurance, etc. upon the pilots will vary with individual airline situations, pilot agreements, and the state in which domiciled but, as an estimate, should vary between 1¢ and 10¢ per flight hour, or an average of 5¢.

Payroll taxes (payable to the employer) covering Social Security and both Federal and State unemployment taxes can be expected to vary between 10¢ and 20¢ per flight hour and should average about 15¢.

Direct maintenance costs per flight hour depend on choice of aircraft, engines, and age of each. This item is an extreme variable because neither aircraft nor engine chosen will have had experience in scheduled certificated airline service. Without this past history, FAA requirements for time between overhauls is apt to start at low intervals and build toward longer and longer intervals. Extreme figures to allow for these variables would probably range from $8.50 to $21 per flight hour with an average figure of $15 per hour.

The last item of direct operating cost is depreciation. The variables in this computation are original cost, depreciation period, residual value and aircraft utilization per year. Assuming an original cost variation between $50,000 and $100,000 per complete aircraft, a variation of three to seven years for a depreciation period, a variation of 10% to 30% for residual value assignment, and from 1,500 to 3,000 hours per year per aircraft for usage, then depreciation could vary from a low of $1.67 per aircraft hour to a high of $20. A mean of $11 seems conservative.

Adding all of the low-side hourly costs set forth above yields a low cost of $25.08 per flight hour. The high-side cost would be $69.58. But the average is $49.65 per hour.

Average aircraft speed is dependent upon type of aircraft, power settings used and average length of hop. These items could give average speeds ranging from 130 mph. to 190 mph. or even higher in some circumstances. Applying a 170-mph. average speed to the average hourly cost figure of $49.65 would produce a direct cost per mile of 29.20¢ — or less than 30¢ per aircraft mile.

Indirect Costs

Indirect — or overhead — costs include maintenance overhead, station costs, communications, sales and advertising, and management. These are costs more subject to control than are the direct costs. For the local service airlines in 1960 these costs averaged 68¢ per aircraft mile. For the trunk airlines the figure was $1.05 per aircraft mile. For a third-level airline, operating in a limited area and performing a specialized service, the figure must be kept about equal to direct costs at 30¢ per aircraft mile.

By combining a third-level operation with an aircraft dealer's fixed-base operation, by holding a tight rein on costs, by applying ingenuity and improvisation, and by developing new methods, a 30¢-per-mile overhead is possible of achievement.

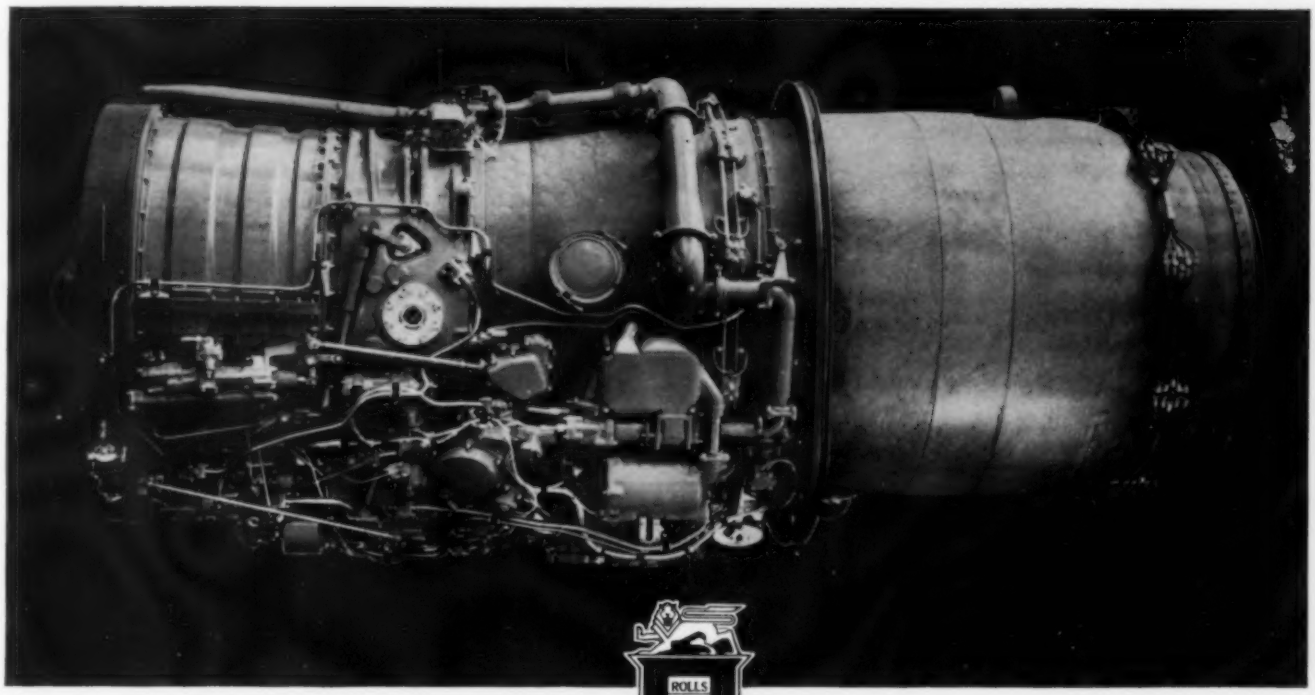
Revenue Possibilities

Now let's investigate revenues. Revenues are made up of passenger fares, express and freight charges, mail revenue and subsidy (known as Public Service Revenue). If total expenses

LATEST BELL YHU-1D IROQUOIS HELICOPTER carries pilot and 12 passengers and made its first flight on Aug. 16. Newest version of the record-breaking turbine-powered Iroquois series for the Army, its cabin space was increased from 140 to 220 cu. ft. by relocation of fuel tanks. Engine is Lycoming T-53-L9 of 1,100 shaft horsepower. Production model will be HU-1D, retaining all dynamic components of HU-1B.

—(Bell Helicopter Photo.)

ROLLS-ROYCE SPEY



BY-PASS JET

ROLLS-ROYCE SPEY ENGINES WILL POWER THE de HAVILLAND TRIDENT, THE BRITISH AIRCRAFT CORPORATION ONE-ELEVEN AND THE BLACKBURN BUCCANEER

The By-Pass principle proved by the Conway is now accepted as the correct formula for jet transports

ROLLS-ROYCE OF CANADA LIMITED, BOX 1400, ST. LAURENT, MONTREAL 9, P. Q.

ROLLS-ROYCE LIMITED, DERBY, ENGLAND

AERO ENGINES • MOTOR CARS • DIESEL AND GASOLINE ENGINES • ROCKET MOTORS • NUCLEAR PROPULSION

approach 60¢ per mile, then total revenues must be at least as much, or service must soon be suspended.

Air Mail revenues amount to about 2% of the non-subsidy revenues of the local service airlines, so a somewhat similar percentage can be anticipated for third-level airlines. Air mail to and from the smaller communities such as might be served by third-level airlines is not abnormally heavy. Further, the Post Office Department generally has arranged well-timed surface transport from major cities into smaller communities at early morning hours and return in late afternoon. This type of surface transport provides for most of the postal needs of the smaller cities, but a well-rounded airline service pattern will bring an improved Air Mail service.

Air Express, carried for the Air Express Division of the Railway Express Agency, and consisting generally of packages weighing between five and 50 pounds, is a source of potential third-level airline revenues. In 1960, Air Express generated about 1½% of local service airline non-subsidy revenues. It seems likely that a similar percentage relationship can exist for third-level airlines.

Because of the limited cargo capacity of the light-twin aircraft, air freight as such probably will not be transported. A specialized light package service, however, might be developed as an additional source of revenue. Individual geographical situations will determine the volume of such traffic. In general, it probably will be quite small or non-existent.

The final source of non-subsidy revenue is passenger traffic. This is the prime revenue generator for a third-level airline and the real reason why such a service should be in existence. The structure for all traffic, be it surface or air, generally has a decreasing rate of charge as distance increases. In 1960 the trunk airlines averaged a 6¢-per-passenger-mile yield for an average journey of 647 miles. The local service airlines averaged 7.3¢ for an average journey of 204 miles. The third-level airline, with an anticipated average haul of less than 100 miles, can justify far levels of 10¢ per mile.

It is anticipated that most third-level passenger traffic will be part of a through-journey involving at least one trunk or local service airline. The 10¢ per mile for a short journey will be absorbed in the through-fare and thus will not appear objectionable. Many airline fares today are at levels of 10¢ per mile *or higher*. The 50-mile segment between Albuquerque and Santa Fe carries a fare level of 13.9¢ per mile on a trunk airline. Yakima, Wash., to Seattle, a distance of 103 miles, despite competitive airline service, bears an 11.4¢ rate. The 95-mile Washington-Richmond journey, despite the competition of three trunk airlines, bears a 9.89¢-per-mile fare.

Average loads will depend upon the capacity of the aircraft utilized in reference to the traffic demand of the routes. Light-twin aircraft on short hops can carry from three to nine passengers in addition to a single pilot. *Maximum* average loads possible with such capacity limits would probably run from two to seven passengers. A plane with five-passenger capacity could be expected to average no higher than about 3¼ passengers. A six-passenger capacity unit could average about four passengers. Whether these averages can be attained would depend on traffic potential, sales ability and quality of service rendered.

The direct cost figures computed early in this article are based principally on an aircraft of six-passenger capacity. An average load of 3½ passengers at 10¢ per passenger mile would yield passenger revenues of 35¢ per mile and total non-subsidy revenues of 36¢ including Air Mail and Air Express at the above stated percentage relationships.

(To be continued next month)

Anyone can fly the Hughes 269A

Fixed-wing pilots can transition to helicopters with a minimum of instruction time in the new Hughes 269A. Even non-fliers learn faster. *Anyone can learn to fly it.* And, there's never a feeling of futility. Its immediate control reaction, plus power to spare, gives you complete mastery of this agile aircraft in the first few hours.

Good News: Your Hughes dealer offers instruction and flight time at ½ *former helicopter rates* in the 269A. Other costs make the same kind of sense: Purchase price—just $22,500; total direct operating costs—only $9.71 per hour (13c per mile); long-life components guarantee minimum maintenance. Now sold and serviced by a growing network of dealers offering expert instruction and complete after-sale service.

Costs less to buy . . . costs less to fly! Wire or write for all of the facts *today:* Commercial Helicopter Sales, Dept. 0209, Hughes Tool Company, Aircraft Division, Culver City, California.

Save time where it really counts—*door to door.* The 269A easily moves in and out of small 30-foot spaces. You fly *over* traffic tangles, go places impossible to reach otherwise.

All mechanical components are rugged, simple and inexpensive—designed for long operating life. This means *years* of trouble-free service for you when you own a Hughes 269A.

Full 360° visibility all-around . . . extra-wide doors, special tinted canopy, plenty of leg, shoulder and head room, handsome interiors . . . all add up to relaxed, comfortable flying.

HUGHES
269A
THE COMPACT HELICOPTER

JET COMMANDER DETAILS

(Continued from page 37)

Electric engine experts, E. B. (Gene) Charles, vice president in charge of sales, revealed details of the Jet Commander Customer Contract. It guarantees a price of $475,000 without an escalator clause, guarantees performance within 5%, and provides that a $25,000 deposit with each order and a $100,000 progress payment due 6 months prior to specified delivery date will bear the prime rate of interest payable to the purchaser.

4. Ted R. Smith, vice president of engineering, launched a hiring program in the Los Angeles area preparatory to expanding his engineering department.

5. Tom Harris, vice president and general manager, said "several" orders had already been received from operators of executive aircraft and indicated military orders will be sought here and abroad for the Jet Commander as a utility transport and navigation trainer. He said its ability to operate from short fields exceeds that of any jet now used for that purpose by the military.

6. Aero Commander will support the new executive jet with a comprehensive one-year warranty on the aircraft and all of its components, while General Electric will support the CJ610 jet engines with its own comprehensive warranty.

7. While the company is working toward an eventual production rate of delivering 4 Jet Commanders per month, its marketing expert, Tom Sim, believes potential demand could go as high as 800 units by 1970 based on the number of executive twins now in use — about 3,600 of them.

"The development of an airplane like the Jet Commander, for both civilian and military application, has been shaping up in our minds as a result of a market feedback over the years," commented Tom Harris. "As a result, we are now in the position to sell and deliver a 500-mph. vehicle with the performance, reliability, safety and economy for which the Commander has always been known."

BEECH RADIO SHOP

(Continued from page 52)

retained in the airplane. From this initial drafting of requirements, the job flows freely through inventory control so as to guarantee any one of the thousand or more small items or parts will not delay final installations. Every piece of equipment is tested and every condition of flight usage is simulated before the over-all system is "bought" by final assembly on an exact mock-up of the aircraft it will occupy. Following this meticulous assembly process, with everything checked out in perfect working order, the whole package goes directly from the mock-up to the Beechcraft airplane coming down the final assembly line.

White maintains a large inventory of the latest equipment from small components to the newest weather radar sets. More than $350,000 has been invested in test equipment alone. The boom in Beech factory electronics installations points up the growing demand on the part of aircraft owners for completely-equipped airplanes with all-weather capabilities, with safety and reliability as their chief concern — not cost.

MOTOROLA M-4 AUTOPILOT

(Continued from page 43)

of center. Aircraft will turn to and intercept LOC beam. Press Track button when vertical pointer is within 1 dot of center. Aircraft will align with LOC beam despite any cross-wind. When glideslope bar reaches horizontal position, press GS button. Aircraft will now follow glidepath. To disengage GS and Track modes, flick Pitch Command switch at the Middle Marker. Aircraft, still on autopilot, will maintain correct attitude to intercept the runway. Hit autopilot quick disconnect switch on control wheel

TURBOPROP POWER FOR DE HAVILLAND DHC-4 CARIBOU will result from flight tests now being readied at Toronto, Canada. Turbine engines are General Electric YT64-4's, each rated at 2,850 hp. with a specific fuel consumption of only 0.49 lbs. per horsepower hour.

NAVION AIRCRAFT COMPANY MARKETING MANAGER is Currie Davis (above), formerly administrative assistant to the president of Tusco Corp., of which Navion Aircraft is a division. Davis is former fighter pilot with advertising agency and oil company experience. Navion Aircraft is now in production at Galveston, Texas.

and manually complete approach-landing.

A sophisticated system such as the M-4 requires a flight demonstration for a complete understanding of its capabilities. Here are some of the details in its operation:

Depressing the HDG button establishes the autopilot in the heading mode to automatically guide the aircraft to execute a pre-selected heading change as set in with the HDG knob. The HDG knob may also be used in place of the Turn knob to manually initiate and control a turn.

The OBS knob on the VOR-ILS Indicator is used to set in the course of the desired VOR/LOC beam during automatic Capture and Track operation. Pushing the Capture button establishes the capture mode in which the autopilot guides the aircraft to intercept and capture a pre-selected VOR or Localizer radio beam course. It is not necessary to use the HDG knob when the autopilot is capturing or tracking.

In the tracking mode, established by pushing the Track button, the autopilot guides the aircraft to closely track the captured radio beam and provides automatic compensation for cross-winds during final approach. It is disengaged by selecting another mode or by momentarily twisting the Turn knob. Pushing the GS button disengages "altitude hold" and establishes both the Glideslope and Track modes in which the autopilot automatically maintains the aircraft centered in the glideslope and localizer radio beams until manually disengaged for touchdown.

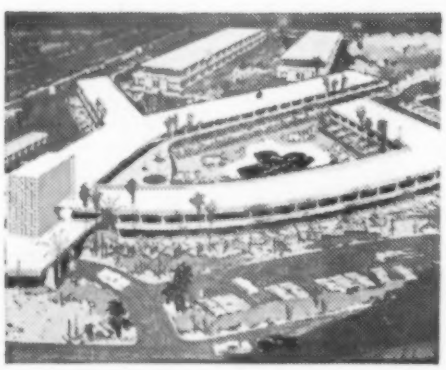
The autopilot maintains the aircraft at the altitude existing at the time the ALT button is pushed. Momentary movement of the Pitch knob disengages the ALT mode.

Normal position of the Norm/Rev Switch is used for the front course of the ILS system and Rev position is used for the reciprocal or back course. This switch reverses the polarity of the Localizer signal and enables normal sensing of the ILS vertical pointer for back-course approaches. A warning light in the face of the instrument reminds the pilot that the needle is reversed.

Course Direction (CD) function of the M-4 system is for pilots desiring course direction type of manual operations as with conventional "Zero Reader" type systems already in use. A spring-loaded monitor switch enables the pilot to momentarily remove computed information from the vertical pointer for an indication of the aircraft's displacement from the desired VOR/LOC beam center.

in the **ARIZONA CAMELBACK MOUNTAIN Area**

HOTEL **Valley Ho**



In Scottsdale — the "West's most Western Town" — 12 miles northeast of downtown Phoenix. Arizona's newest and finest year around hotel. 180 luxurious rooms and suites — all with private sun deck, many have snackbar kitchens. Dining Room, Cocktail Lounge, Heated Swimming Pool, All sports and activities available.

Excellent Meeting facilities for groups up to 200

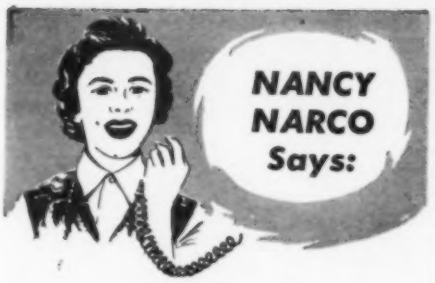
EUROPEAN PLAN
Write for brochure
Robert Foehl, Gen. Mgr.

Scottsdale
ARIZONA

AIRLINE TRANSPORT PILOT
available

Airline Ratings on CV240/340/440, DC-4/6/7. Presently DC-6 Captain on scheduled cargo operation. Degree in Business Administration. Six years experience in life and general insurance. Married — age 42. Desire position combining flying and sales promotional work.

Write **FLIGHT MAGAZINE,** P. O. Box 750, Dept. G., Dallas 21, Texas.



SOON . . . YOU, TOO, WILL BE ORBITING

The advent of DME is opening up a whole new concept of flight patterns and approaches. Heretofore all routings, while sometimes far from the direct route you've filed for, have been a series of straight flight segments. Now you may be flying in circles . . . or parts of circles . . . and find yourself happy doing it, VFR or IFR.

Let's say you're IFR to Florida from the north on Victor 3 which takes you, and practically all other north-south traffic, through the bottleneck of the Jacksonville Omni.

As you near Jax, the Center tells you to circle Jacksonville to the east, radius of 15 nautical miles until intercepting Victor 3 south of Jacksonville. Nothing to it. You fly until your DME says you're 15 miles out, then turn east and fly in a right hand curving flight path keeping your DME needle on 15. You're by-passing Jax with the greatest of ease — no holding, no changing altitude. This is just as handy a procedure if you're VFR, too, for getting around a congested area.

This type of circle flying — or orbiting — will become a common thing and a great boon to expedite traffic handling.

Flying the orbit will be found to be quite a simple matter. It's actually a series of straight flight paths. You fly at right angles to whatever bearing you have on the omni, until your needle shows you're increasing the distance between you and the station. When this happens you change course about 10 degrees and hold that until the distance starts opening up. Then change course again. There's no trick to it and very little practice is needed. Only when you're less than three miles away from a station do you actually fly a continuous banked turn.

This ability to fly around an Omni station at a constant distance, like a gas-powered model airplane on a control line, leads to the ability to set up orbiting approaches with the aid of DME. At airports which don't have their own ILS or range approaches, you can make an approach by flying an orbiting path whose radius is the distance of the airport from the Omni station. And you can set up left and right orbital approaches so you can approach either end of the runway depending on wind. Some such approach procedures have already been published by FAA and many more will be making their appearance in the near future.

Nice thing with DME, too, is that procedure turns and other time-consuming maneuvers are generally eliminated. Funny thing, a curved (DME) path may be the shortest distance from start of approach to the runway.

Regards,

Nancy

NARCO • Fort Washington, Pa.

narco ADF-29

AUTOMATIC DIRECTION FINDER

LIGHTEST WEIGHT • LOWEST COST • LEAST POWER DRAIN • WITH PROVEN INNOVATIONS FOR GREATER ACCURACY, LESS STATIC EFFECT AND LONGER RANGE

The Narco ADF-29 weighs less than 8 pounds, draws less than one ampere (.54 amp), is completely self-contained for compact panel mounting, performs better than the best.

Its revolutionary Narcomatic Sensor replaces the usual rotating loop, eliminates the complication of an electric motor drive and, *most important*, operates on maximum signal strength rather than null or weakest signal. This means the Narco ADF-29 is less tempted to point to thunderstorms or get completely confused with precipitation static. The small streamlined sensor projects only 2¼" to reduce drag.

Don't buy an ADF until you see and fly the amazing ADF-29. Experts agree that the Narco concept is years ahead. And the price, lowest of all, brings this most modern of all automatic direction finders within *your* reach.

ONLY $895

FEATURES YOU'LL LIKE

OIL SEALED INDICATOR provides uniquely stabilized pointer movement. Assures trouble-free operation, too.

TWO-BAND RECEIVER covers *every* frequency between 200 and 1600 kc. Calibrated for very precise tuning.

MVC. In addition to automatic volume control, ADF-29 provides manual volume control, essential for LF range approaches.

ALL-TRANSISTORIZED design saves weight, eliminates warm-up. No separate power supply required.

NOW!
ADF-29R
with
PANEL-MOUNTED
INDICATOR — $995.

See your NARCO distributor or write for ADF-29 brochure

Narco INGENUITY means better radio for less money

narco

NATIONAL AERONAUTICAL CORP., FORT WASHINGTON, PA.

New Business In The Hangar

WILLIAM C. WOLD ASSOCIATES, New York used transport sales broker, reports sale of Harold S. Vanderbilt's Grumman Gulfstream. Purchaser was not identified and price was not divulged. "This is the first sale of a used Gulfstream and we are glad to have broken the ice in this market," Wold commented. "We anticipate a good market in used Gulfstreams."

REMMERT-WERNER, Lambert Field, St. Louis, overhauled the fuel tanks and fuel system, landing gear and hydraulic system on the Zollner Corp. DC-3 flown by Mike Petras. . . . Sun Oil's DC-3 had an engine change and fuel tank repair. . . . At Remmert's Toledo base, the Wabush Lake Railway DC-3 flown by John Weston and Al Andrews had a Sierracote heated windshield installed.

EXECUTIVE AIRCRAFT SERVICE, Red Bird Airport, Dallas, had Walter Idel's Mene Grande Oil DC-3 from Venezuela for interior modifications, 1,000-hr. inspection and overhaul of landing gear and accessories. . . . Two Proctor & Gamble Grumman Gulfstreams, Nelson Rokes, chief pilot, were in for installation of oxygen systems and minor interior modifications. . . . Mario Granada and Charles Morris brought in Socony Mobil's Venezuela-based DC-3 for 1,000-hr. inspection, re-skinning of the right wing and a new interior. . . . New paint job and other work were performed on E. W. Estelle's Esso Tankers DC-3. . . . Also in the hangar were Ernie McGill's Bankers Life of Nebraska DC-3 and Russ Purchase's Dow Chemical DC-3. . . . At the Love Field shops of EAS, Ken Hunter's Kerr-McGee DC-3 had radome repairs, and Mead-Johnson's Convair 340 received electrical repairs.

ON MARK ENGINEERING, Van Nuys Airport, had Bill Farah's B-26 for canopy rework, installation of DC-6 wheels and brakes, short radar nose, heater aux power unit, custom instrument panel, anti-icing system, new control surfaces and other work. . . . Lightweight fuel tanks went into Jim Rubel's Colorado Interstate Gas B-26. . . . Bob Edison's Amerada Petroleum B-26 came in for repaint, engine change, 1,000-hr. inspection, lightweight fuel tanks and new fire detection system. Others in the hangar include Andy Lockhart's William Brothers B-26, Ed McDermott's Rexall Drug B-26, Leo Fitzpatrick's T-28,

COMPARE

Know-How

With the rapid advances today in aircraft electronics, we at Associated Radio are pleased to have been selected to provide prototype installations for FAA certification in such pressurized aircraft as the Fairchild F-27A, Grumman Gulfstream, the Convair 440 and others.

These installations attest to our capabilities and aircraft electronic leadership.

Our large stock of leading brand equipment, together with our one-year unconditional guarantee, makes for our happy customers, be they private or company aircraft owners.

Stop by and . . .

Let's get associated!

ASSOCIATED RADIO LOVE FIELD DALLAS

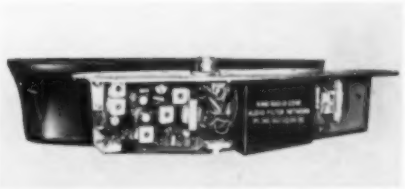
Associated Radio

SERVICE COMPANY

Phone FLeetwood 7-6521

FAA Approved Repair Station No. 3664

3508 Love Field Drive *Dallas 35, Texas*



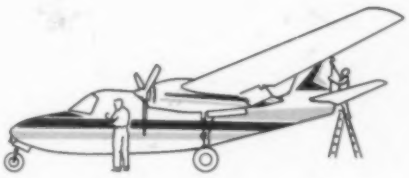
NEW KING KR-20 MARKER BEACON RECEIVER and its antenna are mounted together outside of the aircraft, leaving only the 3-light switch panel (below) to be mounted in the cockpit. Receiver-antenna unit (above) mounts with only 7 small holes drilled in the fuselage skin, requiring no cutting. Transistorized 14 or 28-volt unit weighs less than 2 lbs., is priced at $295.

NOW!
A complete factory-new

8

. . . anything from a "puddle jumper" to a "DC-3"

Downtown Airpark expands paint facilities to cut down "down-time"



Downtown Airpark does the original factory paint work on the Aero Commander

Expanded facilities and increased personnel now enable Downtown Airpark to complete a factory-new paint job on most airplanes in eight days or less. This reduction in "down-time" effects even greater savings for Airpark paint customers.

- NO ADVANCE IN PRICES
- NO COMPROMISE WITH QUALITY
- JUST BETTER PAINT JOBS AT PRACTICAL PRICES IN LESS "DOWN-TIME"

Why not phone or write today and set a date for painting your airplane?

phone before you buy

DOWNTOWN Airpark INCORPORATED

1701 S. WESTERN • OKLAHOMA CITY, OKLAHOMA

FAA APPROVED REPAIR STATION NO. 2034 FOR MODIFICATION OVERHAUL AND REPAIR
COMPLETE PARTS DEPARTMENT • OKLAHOMA DISTRIBUTOR FOR AERO COMMANDER AND LYCOMING AND CONTINENTAL ENGINES

AJ Air Tankers' AJ-1 and New Frontier Airlift's Jet Packet C-82.

ASSOCIATED RADIO SERVICE COMPANY, Love Field, Dallas, installed Collins WP-103 radar in Shamrock Oil and Gas's Convair 240. . . . Bob Dunfee brought in two new Upjohn Beech Queen Airs for complete radio and electronic installations. . . . Narco DME was installed in Fred Bell Enterprises' Cessna 310. . . . Also in the hangar were Walter Idel's Mene Grande Oil DC-3 from Venezuela, Venezuelan Atlantic's Beech, Mobil Oil's Venezuela-based DC-3, Bank of Mexico's DC-3, Bob Stone's Life and Casualty Lodestar and Charles P. McGaha's Beech.

QUALITRON AERO, Burbank, had Food Machinery's Lodestar, flown in by John Kendall and George Johnson, for repaint, interior refurbishing and overhaul of landing gear and Janitrol heater. . . . Allegheny Ludlum's Lodestar, Lloyd Santmeyer and Barnie Harrington, pilots, was in for installation of new FIX-2 VHF receiver and maintenance work. . . . Also in the hangar were Herb Green's Gene Autry Lodestar and two of Lockheed Aircraft International's LASA 60 workplanes, the latter for flight test work in which Qualitron will perform maintenance while they operate from the QA hangar. . . . Don Ruble's Westinghouse Learstar's nav-com equipment was removed for overhaul and functional check while the aircraft was in the Santa Monica hangar. . . . William Holbrook's Kelly-Springfield Lodestar, with Earl Wilson, maintenance chief, was brought in for check and overhaul of all nav-com gear, rebuilding and upholstering pilot and co-pilot seats and interior refurbishing. . . .

FOUR-PLACE COUCH in Burrus Mills' pressurized Aero Commander 720 Alticruiser conceals ice chest in one end and toilet in other end. Installed by Brown Aero at Dallas, custom unit replaced two chairs. With four other chairs, this Commander now carries as many as 8 seat belts.

(Brown Aero Photo by Johnny Brown.)

CALIFORNIA AIRMOTIVE, Burbank, had one of Lockheed-Georgia's new JetStars in for stripping off paint and general clean-up. . . Airline equipment in the hangar included Trans International and World Airlines 1049H Connies, four of Aerovias Sud Americana's Martin 404's, a California Hawaiian 1049 H Connie and a Zantop DC-4.

MAGNAFLUX has announced a new mobile magnetic particle test unit for aircraft line maintenance inspection for cracks and demagnetization of critical airframe or engine steel components.

THERM-O-LAB CORP., North Holloywood, California, has a new lightweight electric blower-heater weighing less than 2 lbs. for use as a combination passenger compartment heater and window defroster. Operating on 12 volts and drawing 30 amps to meet small aircraft requirements, and available for other aircraft, it is a self-contained unit with a sprayed-on film-type ceramic heating element

THIS IS THE ONLY VIBRATION-PROOF AIRCRAFT BATTERY IN THE WORLD. EXECUTIVE BONDING, EXCLUSIVE WITH REBAT, ELIMINATES PLATE DESTROYING VIBRATION, A MAJOR CAUSE OF BATTERY FAILURE. ONE MORE REASON WHY REBAT. EXECUTIVE IS THE WORLD'S LARGEST SELLING AIRCRAFT BATTERY.

THE ELECTRIC AUTOLITE COMPANY, TOLEDO 1, OHIO

AIRCRAFTSMEN, INC.
Will Rogers Field
Oklahoma City, Oklahoma

ALAMO AVIATION, INC.
Municipal Airport
San Antonio, Texas

ATLANTIC AVIATION CORP.
- Teterboro Airport
  Teterboro, New Jersey
- Logan International Airport
  East Boston, Massachusetts
- International Airport
  Philadelphia, Pennsylvania
- New Castle County Airport
  Wilmington, Delaware

BUSINESS AIRCRAFT, INC.
9011 Randolph Street
Houston International Airport
Houston, Texas — MI 4-5595

CURREY SANDERS AIRCRAFT CO., INC.
Downtown Municipal Airport
Shreveport, Louisiana

CUTTER-CARR FLYING SERVICE, INC.
West Mesa Airport
Albuquerque, New Mexico

ELLIOTT FLYING SERVICE
- Municipal Airport, Des Moines, Iowa
- Municipal Airport, Davenport, Iowa

GRAY AIRCRAFT SVC. CO., INC.
D. A. Cody, Service Manager
Love Field, Dallas, Texas

HARTZOG AVIATION
Greater Rockford Airport
Rockford, Illinois

THE NORMAN LARSON CO.
PLANESERVCE, INC. (Service Division)
Van Nuys Airport, Van Nuys, Calif.
(Los Angeles Area)

PIEDMONT AVIATION, INC.
Smith Reynolds Airport
Winston-Salem, North Carolina

ROSCOE TURNER AERONAUTICAL CORP.
Municipal Airport
Indianapolis, Indiana

TEXAS AVIATION CORPORATION
G. K. Roberts, Pounds Field
Tyler, Texas

TOPEKA AIRCRAFT SALES & SERVICE
Municipal Airport
Topeka, Kansas

TRADEWIND AIRPORT CORP.
Tradewind Airport
Amarillo, Texas

TULSAIR DISTRIBUTORS, INC.
Hangar 8, Municipal Airport
Tulsa, Oklahoma

UNITED AIRPLANE SALES, INC.
New Municipal Airport
Wichita, Kansas

YOUNG AVIATION CORPORATION
Lambert Field
St. Louis, Missouri

CERTIFIED Beechcraft SERVICE

The Answer to LOWER MAINTENANCE COSTS!

Certified BEECHCRAFT Service offers many extras to the aircraft owner — extras that do not appear on the service or maintenance bill. But these extras can mean a big saving each year.

A good example of one of these extras is the CLOSE INSPECTION your aircraft and its accessories receive while it is being serviced on the ramp of a CERTIFIED BEECHCRAFT SERVICE STATION. Factory trained service personnel will spot — and call to your attention — any mechanism that is not functioning properly, thereby eliminating costly repairs later.

Certified BEECHCRAFT Service technicians, with their long specialized experience, know your Beechcraft from A to Z. But most important, they take a personal interest — and pride — in seeing to it that your Beechcraft serves you well.

Put Your BEECHCRAFT in BEECHCRAFT Hands

GET THE FINEST

Portable or fixed Installation

OXYGEN SYSTEMS

from ZEP AERO

1 TO 4 PLACE PORTABLE for executive, private aircraft, airlines, ambulances and helicopters. Available in 2 models from 1 to 4 place. Two stage regulator... manual turn off valve...filler adapter...handsome carrying case.

CONSOLE MODELS. Console and custom installations are manufactured by Zep Aero. These automatic continuous flow systems are used by virtually all airlines and business aircraft as they are the most economical and simple to use. Demand regulators also available.

ZEP-O-LIFE—simple to use, apply the comfortable mask, tilt the sphere and start breathing. Each sphere provides approximately 45 minutes supply. Compact carrying case with extra oxygen sphere lets you take it anywhere. Refillable.

Sold through Beech, Cessna, Piper and Zep Distributors and Dealers.

ZEP AERO

113 SHELDON STREET
El Segundo, California

which does not glow and is controlled by a selector switch.

AIRCRAFT TANK SERVICE, Love Field, Dallas, has received the first FAA Approved Repair Station certificate for integral tank sealing. The firm has specialized in this work for 14 years.

REMOVAL OF RAIN AND SLEET FROM COCKPIT WINDOWS by blasts of hot air has proved so effective on United Air Lines DC-8 jets that the company will install the system on Boeing jets. Developed by Douglas to replace windshield wipers, the system uses high-speed 400-degree air blasts from the jet engines to shatter approaching raindrops and evaporate the resulting moisture before it can strike the glass. Pilot vision is not impaired.

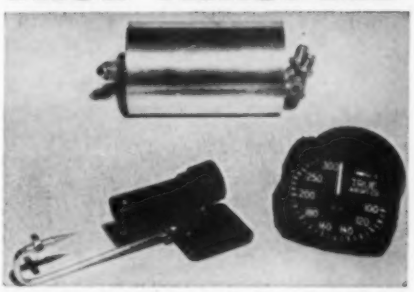
HOWARD AERO SERVICE, San Antonio International Airport, installed 2,000-psi. hydraulic system on Bob MacFarland's Northern Pump Super Ventura. . . . Wheel well door conversion was performed on Lloyd Santmeyer's Allegheny Ludlum Lodestar. . . . Dinny Dunsworth brought in Trunkline Gas Company's Howard 250 Lodestar for power pack conversion and other work. . . . Bob Vinson's International Mineral Super Ventura was in for 6-spot brake installation. . . . Bill Powell took delivery of Russell Firestone's Lodestar after receiving new paint job and new Howard landing gear doors. . . . Charlie Viosca received Anderson Durham's Lodestar after its Howard 250 conversion.

READING AVIATION SERVICE, Municipal Airport, Reading, Pa., performed strip and repaint jobs on an Army L-26C Aero Commander and an Army H21C helicopter. . . . Also in the hangar were an East Coast Aviation Martin 404, Dave Perry's Princess Coal B-26, Kurt Heilbronn's Philadelphia Evening Bulletin Lodestar, Roger Glass's Pennsylvania Glass Sand Corporation Aero Commander, Warren Green's Birdsboro Beech 18, Steve Negoescu's Sharmex Twin-Bonanza and Machinecraft's Twin-Bonanza.

PIEDMONT AVIATION, Winston-Salem, performed modifications and double engine change on Charlotte Aircraft's DC-3. . . . Lawrence Gesse brought in S & W Cafeteria's DC-3 for repairs. . . . Also in the hangar

NEW HEAD OF J. R. GRAY AIRCRAFT CO., Beech distributor in Dallas, is D. A. Cody, shown (left) with Spencer Brent, assistant general manager. Cody is president and general manager.

HUNTER TRUE AIRSPEED



WHY YOU NEED A TRUE AIRSPEED

1. It gives the correct speed at all altitudes and temperatures.
2. You can see for the first time the real speed your ship is capable of flying.
3. When your passenger asks what speed you are flying, just point to the Hunter True Airspeed.
4. When demonstrating an airplane, you do not have to try to explain why the indicated airspeed is so much slower, just point to the Hunter True Airspeed.

PRECISION PILOTS USE HUNTER TRUE AIRSPEEDS TO POWER AND TRIM THEIR SHIPS

INSTALLATION TIME — AVERAGE 2 HOURS SINGLE OR TWINS

ORDER COMPLETE KIT NOW
$250.00

HUNTER TRUE AIRSPEED KITS AVAILABLE AT:

BEECH DISTRIBUTORS AND DEALERS
MOONEY DISTRIBUTORS AND DEALERS
AIR ASSOCIATES DISTRIBUTORS AND DEALERS
STANDARD PRODUCTS, INC. . Wichita, Kansas
BROWN AERO CORP . . . . . Dallas
AIRCRAFT SALES . . . . . Ft. Worth
AEROMARINE SUPPLY . . . . . Birmingham
S. W. AIR RANGERS . . . . . El Paso
SOUTHEAST AIRMOTIVE . . . . . Charlotte
DOWNTOWN AIRPARK . . . Oklahoma City
TRADEWINDS AIRPORT . . . . . Amarillo
BLUE GRASS AIRMOTIVE . . Lexington, Ky.
CHAMP AVIATION . . International Airport, El Paso

HUNTER AERO INSTRUMENT CO.

Box 7055 • Tulsa, Okla. • RI 7-5965

HERE'S THE SIGN OF THE FINEST SERVICE FOR YOUR PIPER AIRPLANE

Piper has established a world-wide network of Factory-Certified Service Centers to assure you of the finest service possible for your Piper airplane.
To earn the coveted designation, service organizations must meet rigid requirements, must be properly equipped and staffed by personnel who have attended the intensive service school conducted at the Piper plant.
Dozens of Piper Factory-Certified Service Centers have been established throughout the nation and around the world, and more are being designated to assure convenient and competent Piper service wherever you may wish to fly.

FOR THE BEST IN PIPER SERVICE AND MAINTENANCE VISIT THE PIPER FACTORY-CERTIFIED SERVICE CENTERS LISTED BELOW

ANDERSON AVIATION CO., INC.
Sky Harbor Airport
2745 *East Airlane*
BRidge 5-5741
Phoenix 34, Arizona

BROWNING AERIAL SERVICE
Municipal Airport
P. O. Box 1173
HOmestead 5-1728
Austin, Texas

CATLIN AVIATION CO.
Will Rogers Field
P. O. Box 2398
MUtual 5-6644
Oklahoma City, Oklahoma

CUMMINGS & GROVES AVIATION, INC.
Houston International Airport, Hangar No. 8
MIssion 4-5593 *and OLive* 4-4351
Houston, Texas

DELAWARE AVIATION CORPORATION
North Philadelphia Airport
HObart 4-1600, *TWX PH* 520
Philadelphia 36, Pennsylvania

EXECUTIVE AIRMOTIVE, INCORPORATED
Stewart Air Park
P. O. Box 70
GArfield 8-3581, *GArfield* 2-7277
Parkersburg, West Virginia

J & J AIRCRAFT, INC.
Sarasota-Bradenton Airport
821 *General Arnold Road*
ELgin 5-6868
Sarasota, Florida

KEN-MAR AIRPARK, INC.
Ken-Mar Airpark
Box 2667, *University Station*
MUrray 3-6589
Wichita, Kansas

RED AIRCRAFT SERVICE, INC.
Broward County International Airport, Building 78
JAckson 3-9624
Fort Lauderdale, Florida

ROSS AVIATION, INC.
Riverside Airport
CY 9-5055
Tulsa, Oklahoma

were Don Price's Pilot Freight Carriers' Beech 18, Joe Pinnix's Winn Dixie Stores B-23, Herb Drew's R. J.

In Dallas —

more and more frequently good pilots choose this frequency

121.1 mc
121.1 mc
121.1 mc
121.1 mc
121.1 mc
121.1 mc
121.1 mc
121.1 mc
121.1 mc

Tune in Addison Tower

ADDISON AIRPORT

INWOOD ROAD AT BELT LINE RD.
AD 9-2315 or AD 9-1490

MINIATURE RADAR AND TV DISPLAY TUBE permits single-person viewing in bright-light conditions and Westinghouse, which perfected it, believes it has usefulness in aircraft. Called "the private eye," its cathode ray tube's 0.60-in.-diameter screen is viewed through a magnifying eye piece with 10-fold enlargement, giving pilot the equivalent of a 6-in. screen observed from a distance of 10 inches. It is 8.5 inches long and weighs 20 ounces.

Reynolds F-27 and DC-3 and Howard Miller's Krispy Kreme Doughnut Beech 18.

PACIFIC AIRMOTIVE, Burbank, delivered to Bill Holbrook and Earl Wilson their Kelly-Springfield Lodestar after repaint, repairs and control system re-rigging. . . . Extensive overhaul work was performed on Commander Jose Brunet's Argentine Naval Commission DC-4. . . . Toyomenka's Grumman Mallard was in for extensive overhaul work and installation of overseas ferry kit, with Skyways Aircraft Ferrying Service delivering the amphibian to Tokyo. . . . PacAero at Santa Monica is converting its fifth FAA Convair to Allison prop-jet power with long range tanks. . . . Larry Anderson's Warren Petroleum Learstar was in for strip and reseal of four main fuel tanks, installation of bleed air door and other work. . . . Rod Christensen brought in his Stauffer Chemical 21,500-lb. Lodestar for AP-101 autopilot certification. . . . W. H. Carroll's Chemical & Industrial Lodestar was brought in for 22,000-lb. gross weight modification, interior refurbishing and radio installations. . . . Art Nyberg brought in the Gillette Gulfstream for radio work. . . . Lyle Estelle's Harry & David DC-3 was in for service, as was Earl Johnson's Storer Broadcasting PV-1.

PLANESERVICE DIVISION of the Norman Larson Co., Van Nuys, installed new electronic equipment in Scott Crossfield's Bonanza. . . . Edward Wallace, formerly with Collins, has joined the company as radio lab foreman.

Arizona's Airport
TUCSON

THE PLACE TO STOP
RALEIGH-DURHAM
NORTH CAROLINA

Aircraft Title Searches
Airmen Record Information
Recording Services
AERO RECORDS & TITLE CO.
CRAVENS BLDG.
OKLAHOMA CITY, OKLA. CEntral 9-2507

FOR SALE
DOUGLAS B-23
Executive Aircraft
Extra parts including
One Overhauled Engine
Complete Information
On Request
BIDS ACCEPTED
Contact
H. C. PRICE CO.
Bartlesville, Oklahoma
Federal 6-8000

WE NEED USED AIRCRAFT
Singles & Twins
Will purchase by phone and pick up at your airport.
Jack Richards
AIRCRAFT SALES
WH 9-3243
Box 7624 Oklahoma City

FLYING INSURANCE BY FLYERS
Phone, write or wire for immediate quotations of most favorable rates
Aircraft Hull & Liability — Airport Liability
Hangarkeepers Liability — Life & Group Plans
DON FLOWER ASSOCIATES, INC.
Wichita, Kansas — Ft. Lauderdale, Florida
Cable — AIRSURE
Complete Insurance Coverage

AUTHORIZED
Cessna
SERVICE

Symbol of the Man on the Go...

The AUTHORIZED CESSNA SERVICE sign has a significant meaning to the **man on the go.** As a man of vision, decision and action he has found this symbol means high quality service and maintenance, a ready supply of factory authorized parts in stock when needed and reasonable flat-rate prices. These are some of the factors he took into consideration when he selected his CESSNA aircraft for the performance, comfort and operational reliability he required. If you are a **man on the go** you have a great deal to gain from the high standards and uniform services available to you at the AUTHORIZED CESSNA SERVICE symbol.

A visit to the firms listed is your assurance of service satisfaction.

Aircraft Sales Company
Gregg County Airport
Longview, Texas
Meacham Field
Fort Worth, Texas

The Air-Oasis Company
3353 Lakewood Boulevard
Long Beach 8, Calif.

Airnews, Inc.
260 E. Terminal Drive
San Antonio, Texas

Champ's Aviation, Inc.
Municipal Airport
El Paso and Lubbock, Texas

Clinton Aviation Company
Stapleton Airfield
Denver, Colorado

Cruse Aviation, Inc.
International Airport
Houston, Texas

Executive Aircraft Company
701 Perimeter Road
Kansas City, Missouri

Lynch Flying Service, Inc.
Logan Field Box 1575
Billings, Montana

Macon Air Service, Inc.
P. O. Box 2036
Macon, Ga.

Ragsdale Aviation, Inc.
Municipal Airport
Austin, Texas

Southwestern Skyways, Inc.
Municipal Airport
Santa Fe, New Mexico
and Ogden, Utah

Sunny South Aircraft Service, Inc.
Broward International Airport
Fort Lauderdale, Florida

Walston Aviation, Inc.
Civic Memorial Airport
East Alton, Illinois

Wings, Inc.
Wings Field
Philadelphia 18, Pa.

Yingling Aircraft, Inc.
Municipal Airport
Wichita, Kansas

WHAT ?? WHERE HOW MUCH $

We Will Spend

$450,000.00

CASH

Each sixty days
For Clean Airplanes
Telephone for Cash Bid

BOB CARR — JACK WALL
JACK ADAMS
(Memphis) EX 1-4436
Jack Adams Aircraft Sales, Inc.
Box 121 Walls, Miss.

OPERATORS! PILOTS! MECHANICS!
Need Employment Assistance?
Send For Application
AVIATION EMPLOYMENT COUNSELORS
Douglas County Airport Minden, Nevada

PINION GEARS FOR ALL
BENDIX 756 & 397 STARTERS

EA46916	$13.50 each
EA21593	13.00 each
EA21585	5.50 each

AIRCRAFT PARTS CORP.
PO Box 247 Tel. Lenox 9-1311
Forest Hills 75, New York

ZEP OXYGEN EQUIPMENT
AERO *Manufacturers of Oxygen Equipment*
Phone: Spring 2-1421, El Segundo, California

FOR COMPLETE INFORMATION REGARDING MEMBERSHIP IN
The United States Pilots Association
Write . . .
333 North Michigan Avenue
Chicago 1, Illinois

FOR IMMEDIATE SALE

	Total Time
1960 G18S Super 18	50 Hours
1960 Queen Air	138 Hours
1960 D50C Twin Bonanza	275 Hours

Call or Write
GOLDEN GATE AVIATION, INC.
Oakland Airport, Oakland, Calif.
Phone: NEptune 2-5731

2 EXECUTIVE DC-3's

Both Less Than 8,000 TT, Recent OH, Radar, A-12, Excellent Compliment Radio, One Has -94's, Other -75 engines.

EXECUTIVE CONVAIR 240

LEARSTARS — A26's — SUPER PV1

WELSCH AVIATION CO.
P. O. Box 29, LaGuardia Airport
TWining 8-5420 — New York

EXCELLENT C50 TWIN BONANZA

PRICED FOR QUICK SALE
$29,500

BOB HUDGENS • Box 92
Montgomery, Alabama • 262-5212

Plenty of Parts for

Convair	DC3-C47
Beech	Lodestar

A.R.C.	Pratt & Whitney	Accessories
Bendix	Wright	Instruments
Collins	Continental	De-icers, Tires
Sperry	R.C.A.	Standard Parts

Write or Call — Air Express Service

NAVCO Inc.
Lambert Field
St. Louis, Mo.
PErshing 1-1710

MATTITUCK AIRBASE CORP.

BETTER AIRCRAFT MAINTENANCE
F.A.A. APPROVED REPAIR
STATION #3569
AIRFRAME CLASS 3
LIMITED CLASS 4
CUSTOM INTERIORS & PAINTING,
CONVERSIONS & EXPERIMENTAL MODIFICATIONS,
MAJOR OVERHAUL & INSPECTIONS
LINDEN AIRPORT—LINDEN, N. J.
Hunter 6-8800 Digby 9-3140

FOR SALE

ROYAL GULL
Total Time: 609 Hrs.

LE-609 — RE-133, 5-place twin engine amphibian, fresh relicense, 270 hp. Lycoming engines, full panel, Magnesyn compass, 50 amp. generators, Stewart-Warner heater, good radio. Price $32,500.00.

CURREY SANDERS AIRCRAFT COMPANY, INC.
P. O. Box 7311, Shreveport, Louisiana
Telephone: 422-8328

READING AVIATION SERVICE, INC.
HEADQUARTERS FOR EVERY AVIATION NEED

- **Radio and Radar**
- **General Maintenance**
- **Instrument Overhaul**
- **Used Aircraft Sales**

RAS INCORPORATED

- **Engine Overhaul**
- **Prop Overhaul**
- **Executive Interiors**
- **Custom Painting**

AERO COMMANDER SALES & SERVICE
Municipal Airport, Reading, Pa. — FR 5-8551

YOU — Will be surprised!
YES — We're sure you will be!
WHEN — You see what a "buck" or a hundred "bucks" will buy in our NEW 1960 Catalog of Sport Parachuting Equipment. Bargains! It's loaded!

FILL OUT AND MAIL COUPON TODAY
—Please Print—
Send 1960 Bargain Catalog to:

NAME_____
ADDRESS_____
CITY_____ STATE_____

McELFISH PARACHUTE SERVICE
2615 Love Field Drive
Dallas 35, Texas

Sale — Exchange

CA18 CB16 CB17

P&W R2800	R2600 Wright
P&W R1830	R1820 Wright
P&W R1340	GO480 Lycoming
P&W R985	0470 Continental

Super-92

ENGINE WORKS
Lambert Field Inc. St. Louis, Mo.

WE BUY TWINS

CASH NOT CONVERSATION

THERE IS A DIFFERENCE!

One or complete dealer stocks, new or used. We'll buy over the phone. No Red Tape. We pick up. Send for our free list of buys.

VEST AIRCRAFT CO.
Box 5306
EM 6-2663 Denver, Colo.

Convair CV300

Another new, deluxe executive CV300 Convair conversion, is ready for your inspection in St. Louis. It is freshly overhauled, with a beautiful interior, complete equipment, and your choice of CA18 or CB16 engines, and will be delivered with a new ship guarantee. Maintenance or operating contracts are available. The CV300 is your most experienced and economical pressurized executive aircraft. It is faster than 240, 340, or 440, and is one of the best short field large aircraft. Operational costs per mile are comparable to DC3.

Convair 240s

Immediate Delivery
Licensed

Sale or Lease

Inspect at
St. Louis

Convair Parts

Multi-million dollar stock on hand of all major and minor parts for complete overhaul, replacement, or routine repair of airframe, engines, props, or systems. Everything from a gasket to a whole airplane, ready to ship or install.

Convair Maintenance

Simple inspections to major overhaul. You can know in advance the cost to operate Convair, DC3, or Twin Beech. We'll guarantee your maximum cost with a contract to maintain airframe, engines, and everything for one flat hourly rate.

Convair Modifications

Square Augmentors — Quieter cabin, higher airspeed, lower stall speed, higher critical altitude, better climb, cooler takeoff and climb.

CB16 or CA18 Engines — Only difference is rear case. Neither is converted military surplus, but is the later model designated for economical, dependable, commercial operation.

Alternators — Similar to 340-440 system, for emergency electrical power.

Rear Entrance — No danger from props, no heat loss when open in cold weather. Simpler, lighter, more convenient. Allows better weight distribution and space utilization than front door.

Auxiliary Ground Heater — Warms cabin before flight with 20,000 BTU, without use of an APU.

Double Windows — For a quieter cabin.

440 Radome — Not a small blister nose, but a full sized radome with no restriction on radar antenna size.

X-Ray Nose — Ask about our CV300 X-Ray Nose. A Collins X-Band Radar and Remmert-Werner Radome, integrally mounted, with no wave guides, in one, easily accessible, easily maintained, package unit.

Long Range Tanks
Radar-Autopilot
Fine Interiors

DC3 - C47

Super-92 DC3 — Newly converted deluxe executive, picture windows. NTSO with new ship guarantee.

Super-92 DC3 — Newly converted executive, NTSO, new ship guarantee. Comfort, economy.

Airline DC3 — Recent 8,000 hr. OH. Certif. for FAA Part 45, 17-23 seats, Collins radio.

DC3 Parts

Our warehouses are full of engines, accessories, props, and all parts from rivets to airplanes.

CV240 Convair — Executive, low TSO. Can be converted to CV300.

Also executive **Goose, Apache,** other **DC3s,** etc.

DC3 Maintenance

America's most experienced maintenance from small gripes to complete reconstruction.

S51 Helicopter — Executive, new plush interior, NTSO engine.

UH12B Hillercopter, Super — New 200 HP engine, new interior, dual, night, VHF, trailer.

DC3 Modifications

Update yours with gear doors, short stacks, wing tanks, interiors, big engines, full conversions, etc.

Custom 18 Twin Beech — NTSO, newly converted, new ship guarantee. Picture windows, big cabin, Collins radio.

3 D18Ss — Excellent executive, hydromatic, not military. Nose tanks, some NTSO engines.

Remmert-Werner, Inc.

St. Louis	Florida	Toledo	Trenton
Lambert Field	Pompano Airport	Express Airport	Mercer Airport
PErshing 1-2260	WEbster 3-4516	UNiversity 5-2328	TUxedo 2-6500

Call
St. Louis
PErshing 1-2260

Riley 65

a new "value factor" in business aircraft!

the high-performance twin that cruises 230 mph...flies 1400 non-stop miles... climbs 1800 fpm... sells for $38,950!

Our new brochure explains many additional engineering achievements that add to the beauty, comfort, safety, performance, and value of this practical executive transport.

If you own a 310, let us show you how economically our conversion shops can customize it to perform like a Riley-65.

Riley

AIRCRAFT, INC.

JA 2-0632 — Box 5019

Riley's Ramp, Broward County International Airport

Fort Lauderdale, Florida

shops can customize it to perform like a Riley-65.